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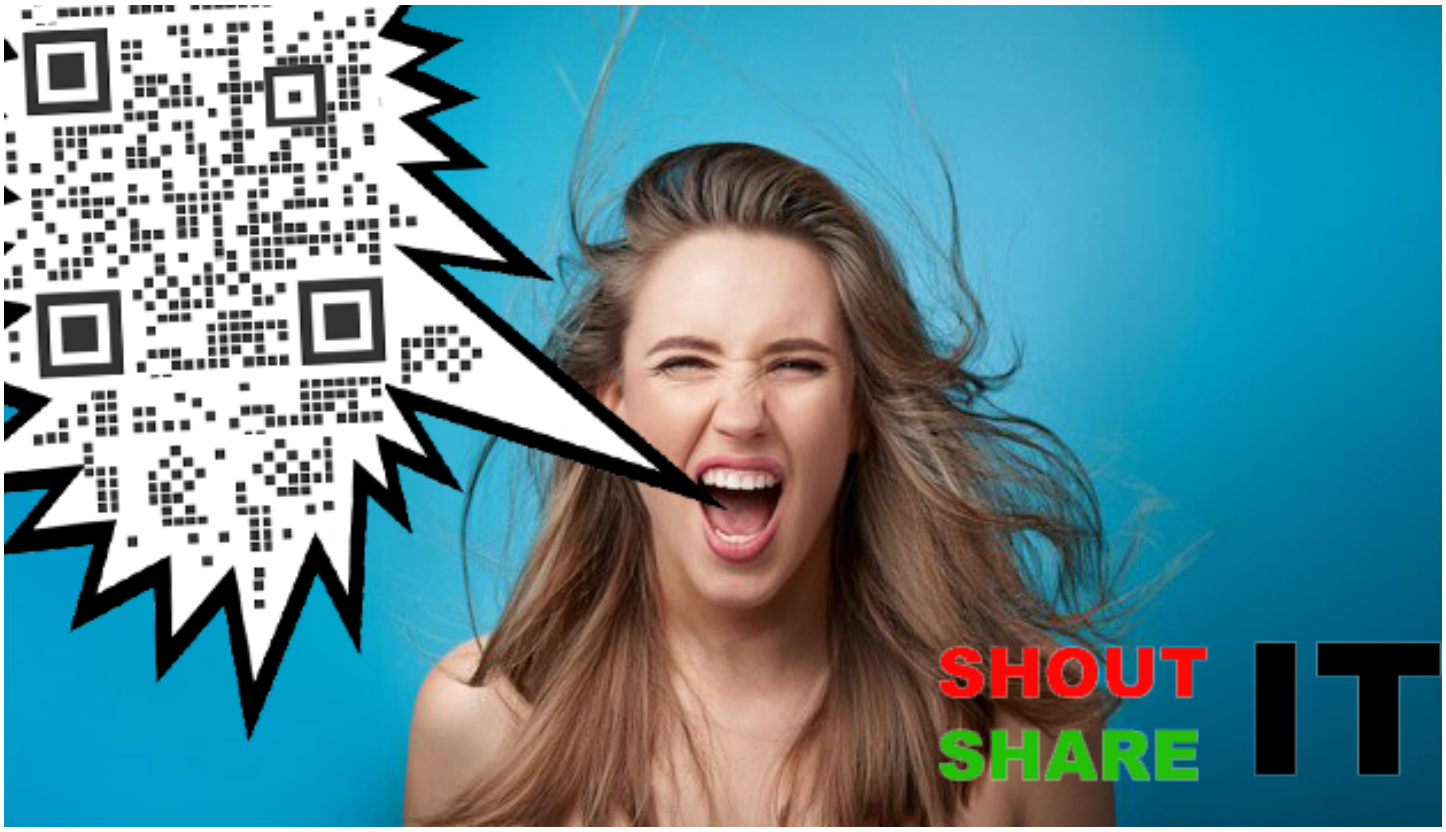
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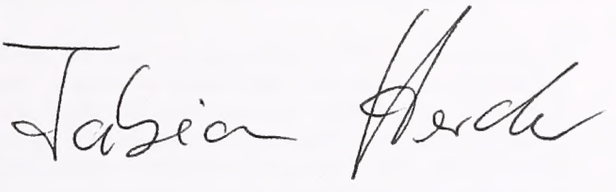
Editorial

Welcome to the first issue of the Bonn zoological Bulletin in 2012. The most comprehensive of the papers published here is a revision of the East Palaearctic beetle genus *Lobrathium*, containing descriptions of a total of thirty-three species new to science, a catalogue of all species of the Palaearctic, and keys for the Himalaya and China. Revisions like this one, written by Volker Assing, set the stage for further taxonomic work in the respective group of organisms, and remain a highly valuable reference for decades. Descriptions of two additional Asian beetle species, the first record and redescription of a Geometer Moth from Iran and Turkey, and a morphological study focusing on the larval urticating apparatus of a Lappet Moth species add to our knowledge of arthropod diversity.

Other studies published in the present volume deal with vertebrates, namely fishes and lizards. Two taxonomic papers give first descriptions of new colourful killifish species from West Africa, and the study by Wagner and co-authors provides data on morphology, behaviour and habitats of a snake-like plated lizard in Zambia. A second brief herpetological manuscript reports for the first time the life colouration of a conspicuous, beige to pinkish, burrowing Madagascan skink. Finally, a brief note proposes in a nomenclatorial act a replacement name for a fish genus.

The Bonn zoological Bulletin is an open access journal, and its contents have so far been published online in a section of Museum Koenig's website. These pages have now been replaced by a new, attractive website available at: www.zoologicalbulletin.de. I am pleased to announce that this website will be accessible with publication of this issue, increasing the visibility of the journal and its contents. The new, comprehensive archive with the complete set of open access pdfs is currently under development, a process that will be completed later this year. The "old" website will of cause be maintained at least until the transfer of BzB contents is completed. I thank Kat Stojanov and Sebastian Hüllen very much for setting up this new portal; I am convinced that readers and authors will take multiple advantage of it.

With best wishes to all readers, authors and colleagues from the "BzB-team",



Fabian Herder (Editor-in-Chief, Fish Curator at ZFMK)
Bonn, July 2012

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Aphyosemion pseudoelegans (Cyprinodontiformes: Nothobranchiidae), a new killifish species from the Cuvette centrale in the Congo Basin (Democratic Republic of Congo)

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Abstract. *Aphyosemion pseudoelegans,* new species, is described, based on collections that have been misidentified for decades as *A. elegans* by all authors. The new species superficially resembles *A. elegans*, but can be distinguished from the latter and all other species of the genus by a diagnostic combination of colour pattern characters, most prominently it has a dark red to black dorsal fin in males, a colour pattern always absent in all known *A. elegans* populations, including the type specimens, and an asymmetrical colour pattern on caudal fin margins versus symmetrical in *A. elegans*. *Aphyosemion pseudoelegans,* new species, is found in small rivers on the left bank of the middle Congo, where it occurs sympatric and sometimes even syntopic with *A. elegans, A.* sp. aff. *castaneum,* or an undescribed species of *Aphyosemion* at Ikela.

Résumé. *Aphyosemion pseudoelegans*, espèce nouvelle, est décrite, sur base de collections qui furent, depuis des décades, mal identifiées en tant que *A. elegans* par tous les auteurs. La nouvelle espèce ressemble superficiellement à *A. elegans*, mais peut en être distinguée, ainsi que de toutes les autres espèces du genre, par une combinaison diagnostique de caractères du patron de coloration. Principalement, elle présente une nageoire dorsale rouge foncé à noire chez les mâles, un patron de coloration toujours absent chez toutes les populations connues de *A. elegans*, y inclus les spécimens types, et un patron de coloration asymétrique des marges de la nageoire caudale alors qu'il est symétrique chez *A. elegans*. *Aphyosemion pseudoelegans*, espèce nouvelle, se rencontre dans de petites rivières de la rive gauche du Congo Moyen. Elle y est sympatrique, et parfois même syntopique, de *A. elegans*, *A.* sp. aff. *castaneum*, ou une espèce non-décrite de *Aphyosemion* à Ikela.

Key words. taxonomy, *Aphyosemion elegans*, DNA, morphology, distribution.

INTRODUCTION

In some recent publications, the taxonomy of species of *Aphyosemion s.l.* (Cyprinodontiformes: Nothobranchiidae) of the Congo basin was reviewed, leading to a revalidation of a taxon and the description of new species (Huber 1994, 2004, 2005a, b; Huber & Scheel 1981; Van der Zee & Huber 2006; Van der Zee & Sonnenberg 2010, 2011; Woeltjes 1984). Here the genus *Aphyosemion* Myers, 1924 is used in a more restricted sense, as proposed in three recent publications of the authors (Sonnenberg 2007; Van der Zee & Sonnenberg 2010, 2011). This corresponds with the subgenus *Aphyosemion* or the *A. elegans* species group of other authors (e.g. Collier 2007; Huber 2007; Murphy & Collier 1999; Wildekamp 1993) and includes 17 species currently accepted as valid (Van der Zee & Sonnenberg 2011). However, the species level taxonomy of this genus is still not settled. In a recent publication, the occurrence of another undescribed species was indicated, frequently misidentified as *A. elegans* (Baensch & Riehl 1985; Huber 2005 a, b; Ott 2002; Scheel 1968, 1990; Seegers 1997; Van der Zee & Huber 2006; Wildekamp 1993) from the central Congo basin, based on diagnostic colour pattern differences and supported by a preliminary DNA study (Van der Zee & Sonnenberg 2011).

In 1899, Boulenger described *Haplochilus elegans* based on specimens which originated from Bikoro at Lac Tumba (Democratic Republic of Congo), and Coquilhatville, close to the Congo River (currently Mbandaka, capital of the province Équateur, Democratic Republic of Congo). Later this species was included in the genus *Aphyosemion*, erected by Myers in 1924.

Until recently, it was assumed that *A. elegans* is variable with respect to colour pattern, including that of the dorsal fin (Radda & Pürzl 1987; Huber 2004, 2005a, b; Van der Zee & Sonnenberg 2011; Wildekamp 1993). However, the known collections currently identified as *A. elegans* can easily be separated into two groups, distinguished by dorsal fin colouration and colour pattern of the caudal fin. One group has a light dorsal fin with many

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small red dots and a symmetric colour pattern in the caudal fin, whilst the other has a mainly dark red dorsal fin (Van der Zee & Sonnenberg 2011) and an asymmetrical caudal fin pattern.

Within the description of *Haplochilus elegans,* a drawing of a male syntype was published, that clearly shows the colour pattern of the median fins. Additionally it was mentioned in the text, that all median fins are provided with carmine red dots (Boulenger 1899). A dark dorsal fin was never mentioned, nor does the drawing of a syntype show this character. This indicates that the types of *A. elegans* belong to the group with a narrow red edge and small red dots on a light background on the dorsal fin.

Aphyosemion elegans is widespread in the central and northern Congo Basin (Fig. 1). All known populations from the northern part of the basin have a dorsal fin with a narrow red edge and red dots on a light background. In contrast, in the central part of the basin, the Cuvette centrale, several populations show a complete or nearly complete dark red dorsal fin. Both phenotypes occur within the Cuvette centrale in sympatry, and at Bokuma (Équateur Province) they occur syntopic (Fig. 1; syntopic collection: MRAC 79229–79236 *(A. elegans)*, MRAC 79237 *(A. pseudoelegans*, new species)). In addition, *A. pseudoelegans* can be found sympatric and syntopic with *A.* sp. aff. *castaneum* in parts of the Cuvette centrale and with an undescribed species of *Aphyosemion* at Ikela (see Van der Zee & Sonnenberg 2011; pers. obs. unpub.).

The probably first import of live specimens with dark red dorsal fins to Europe might have been made by Lambert in the sixties, originating from Boende (Baensch & Riehl 1985, as *A. elegans*). Both, *Aphyosemion elegans* sensu Boulenger (1899) and specimens with a dark red dorsal fin were kept and bred by aquarium hobbyists, especially the recent imports from the Boende area (Ott 2002; Van der Zee & Sonnenberg 2011), so it could be confirmed that the offspring only shows the parental colour pattern (pers. obs., H. Ott pers. comm.).

In addition, a recent phylogenetic analysis based on mitochondrial DNA data of 11 species of *Aphyosemion* indicated that specimens with a dark dorsal fin do not belong to *A. elegans.* Instead, they represent an undescribed species (Van der Zee & Sonnenberg 2011). In this paper the species with the dark dorsal fin, called preliminarily *A.* sp. Cuvette in Van der Zee & Sonnenberg (2011), is described as *Aphyosemion pseudoelegans*, new species.

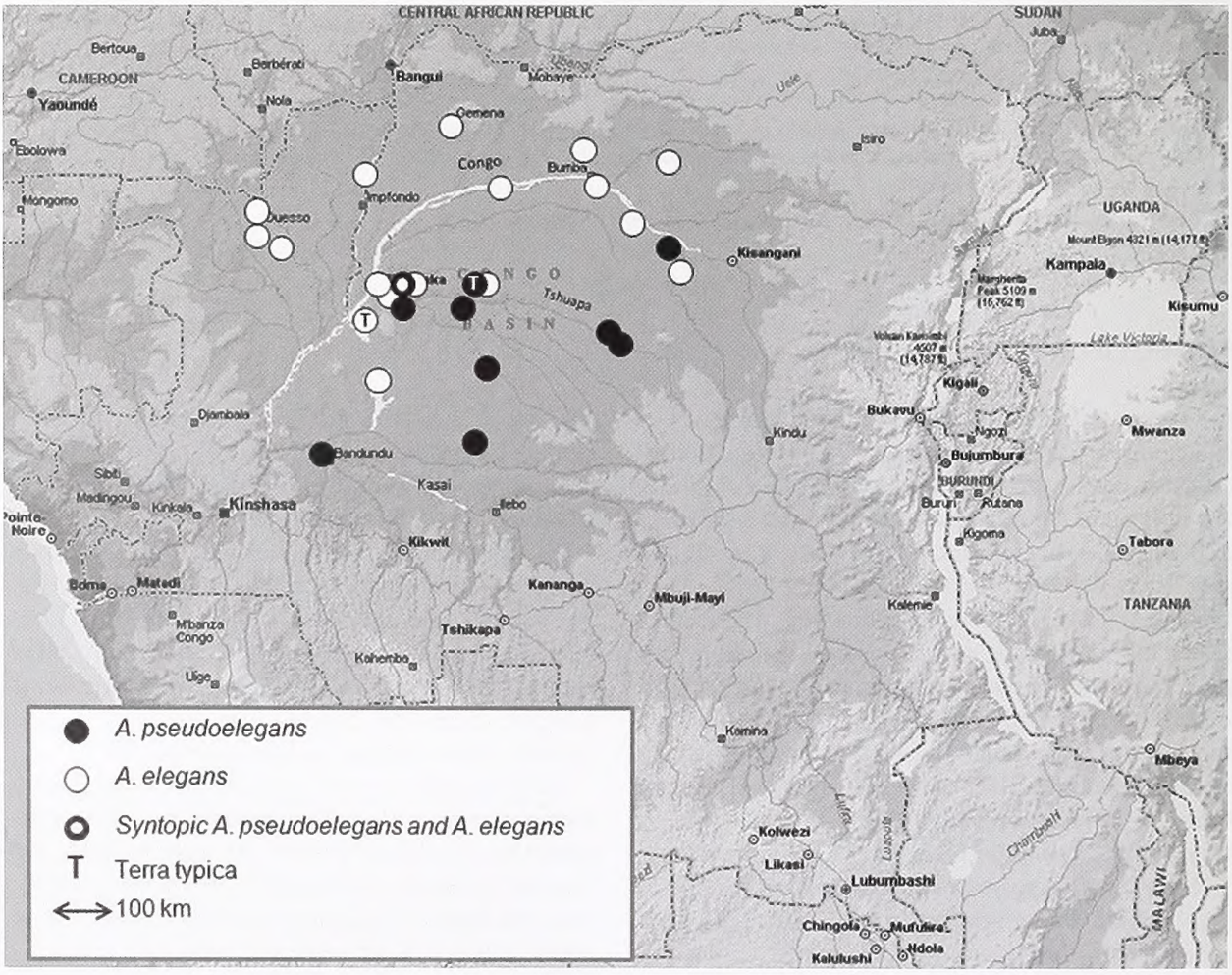

Fig. 1. Collection point map of *Aphyosemion pseudoelegans* and *Aphyosemion elegans* based on specimens and data from the AMNH, MNHN, MRAC, and ZSM collections.

Table 1. Morphometrics of *Aphyosemion pseudoelegans*, new species (H = holotype, P = paratypes: 8 males and 3 females). All measurements in percentages of standard length, standard length in mm. Paratype 1 MRAC 178017, paratypes 2–11 ZSM 32434.

	H ♂	P 1♂	P 2♂	P3 ♂	P 4♂	P 5♂	P6♂	P 7♂	P8 ♂	P9♀	P10♀	P11♀
Standard length	33.3	36.7	33.3	32.0	29.9	27.2	25.8	26.4	25.8	28.7	24.9	23.7
Body depth	18.0	19.1	18.0	17.5	19.7	19.8	20.5	20.1	20.5	19.5	21.1	21.1
Head length	22.5	21.8	21.0	22.5	22.7	22.1	22.1	23.1	22.1	20.6	22.8	22.8
Eye diameter	7.8	7.1	7.2	7.8	8.0	8.5	8.5	8.3	8.5	7.7	8.8	8.9
Interorbital width	10.2	10.6	11.1	10.9	10.7	12.1	12.4	10.6	12.4	10.5	10.4	11.4
Pre-dorsal length	69.1	68.1	66.4	68.1	67.2	68.8	69.4	65.2	69.4	65.9	69.1	70.9
Pre-anal length	54.7	59.4	55.0	55.6	53.8	57.3	57.8	57.2	57.8	53.7	53.4	57.8
Pre-ventral length	45.6	44.4	44.1	44.7	42.5	44.1	42.2	43.6	42.2	41.8	44.6	48.1
Dorsal fin base	12.3	12.0	10.8	9.7	12.0	11.0	11.0	11.0	10.9	9.4	10.4	10.1
Anal fin base	23.7	22.3	19.5	20.6	20.4	22.8	20.5	20.5	18.6	16.7	19.2	19.0
Caudal ped. length	23.7	22.6	23.1	22.5	24.1	22.8	23.9	21.6	25.2	23.3	18.9	22.4
Caudal ped. depth	12.3	12.5	13.2	12.2	14.0	13.6	13.6	13.3	13.2	12.2	12.9	13.5
Caudal ped. ratio	1.9	1.8	1.7	1.8	1.7	1.7	1.8	1.6	1.6	1.9	1.5	1.7

Table 2. Meristics of the types of *Aphyosemion pseudoelegans*, new species. Numbers indicate observed values, numbers in parentheses the frequency of occurrence; data of the holotype are indicated by an asterisk. Lateral line scale count only for the nine specimens with no loss of scales.

meristic count	**number (frequency)**
Dorsal fin rays	8 (7), 9 (5*)
Anal fin rays	13 (3), 14 (8*), 15 (1)
D/A	8 (4*), 9 (6), 10 (2)
Caudal fin rays	24 (3), 25 (5), 26 (2), 27 (1*), 28 (1)
Lateral line scales	29 (5), 30 (4*)

MATERIAL AND METHODS

The description of the new species is based on collections made in the Central Congo Basin, deposited in the Royal Museum for Central Africa (MRAC, Tervuren, Belgium) and the Zoologische Staatssammlung München (ZSM, Munich, Germany). Additional non-type and comparative material is listed in Van der Zee & Sonnenberg (2010, 2011) and below.

Counts and measurements follow Amiet (1987) and were taken with a digital caliper, partly under a dissecting microscope, and rounded to the nearest 0.1 mm. Measurements, including those taken on the head, were presented as percentages of standard length (SL). All visible fin rays were counted, relative position of first dorsal fin ray to anal fin (D/A) is estimated as in Sonnenberg & Schunke (2010). Nomenclature for neuromast system on head follows Scheel (1968) and Van den Bergeijk & Alexander (1962), and for supraorbital (or frontal) squamation Hoedeman (1958). Heads of different species of *Aphyosemion* were scanned with a Scanco viva CT40 at the Max-Planck-Institut für Evolutionsbiologie (Plön, Germany). Digital X-ray images were made with a Faxitron LX-60 Digital Specimen Radiography System at the Zoologisches Forschungsmuseum Alexander Koenig (ZFMK, Bonn, Germany).

As species concept, we adopted the pragmatic approach by Moritz et al. (2000) which is similar to the Evolutionary or Phylogenetic Species Concept.

RESULTS

Aphyosemion pseudoelegans, new species

(Fig. 2; Table 1–2)

Aphyosemion elegans, non (Boulenger, 1899): Baensch & Riehl (1985), Huber (2005 a, b), Ott (2002), Scheel (1968, 1990), Seegers (1997), Van der Zee & Huber (2006), Wildekamp (1993).

Aphyosemion sp. Cuvette: Van der Zee & Sonnenberg (2011).

Aphyosemion sp. aff. *elegans*: Van der Zee & Sonnenberg (2011).

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Fig. 2. **A)** Male of *Aphyosemion pseudoelegans*, collected at Boende in May 2002, not preserved. Digital copy of a colour slide. **B)** Female of *Aphyosemion pseudoelegans*, collected at Boende in May 2002, not preserved. Photographed by H. Ott three months after collection.

Holotype. MRAC 178016, male, 33.3 mm SL, Democratic Republic of Congo, Équateur Province, Tshuapa Basin, Boende, 0°14'S, 20°50'E, coll. P. Brichard, 1969.

Paratypes. MRAC 178017, male, 36. 7 mm SL, collected with the holotype; ZSM 40762 (ex ZSM 32434), 7 males, 25.8–33.3 mm SL, 3 females, 23.7–28.7mm SL, Democratic Republic of Congo, Bandundu Province, Lokoro Basin, Lui Kotale, 2°45'S, 20°21'E, coll. G. Hohmann, November 2000.

Diagnosis. (Figs 2–3) *Aphyosemion pseudoelegans* shows the diagnostic combination of characters for the genus *Aphyosemion*, which are: preopercular neuromast system with six pores, slender body shape, posterior origin of dorsal fin, dorsal fin small with less than ten fin rays, extended fin rays at the edges of the caudal fin in males, and females with a well visible reticulation due to dark scale borders.

Males of *A. pseudoelegans* differ from all other *Aphyosemion* species by a diagnostic combination of colouration characters. Most prominently it differs from all other species except *A. congicum* (Ahl, 1924) by the almost complete dark red to black dorsal fin versus red dots or stripes on lighter background. It also differs from all other species except *A. elegans* (Fig. 4) by irregular narrow vertical red bars, based on confluent dots, on flanks of males.

It differs from *A. congicum* by having an asymmetrical colour pattern of the marginal and submarginal bands in the caudal fin versus colour pattern of dorsal and ventral marginal and submarginal bands symmetrically.

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Fig. 3. Dorsal fin of male specimens preserved in ethanol. In these specimens the red pigmentation is lost, but the difference in colour pattern between the two species is still visible. **A)** *A. pseudoelegans,* MRAC 80709–80777, Bokuma, with plain greyish to brownish fin tissue. **B)** *A. elegans,* MRAC 93724, Bokuma, fin tissue with light dots which are the remains of the former red pigmentation.

Aphyosemion congicum has only a few red dots on the flanks and an almost dotless anal fin versus many red dots or bars on flanks, anal fin with many red dots or inter radial red stripes.

Besides the dark dorsal fin, the body colour pattern resembles that of *A. elegans*, but *A. pseudoelegans* has an asymmetric colour pattern in the caudal fin versus a symmetric pattern in *A. elegans*. In general, *A. pseudoelegans* is more intensely pigmented then *A. elegans*, often having larger and more red dots on the flanks and a denser red pigmentation of the head. *Aphyosemion elegans* always shows two or more small isolated rounded red dots underneath the eye, whereas in most *A. pseudoelegans* these dots are larger and irregular and often fused, forming a red streak. In very heavily pigmented *A. pseudoelegans*, the red dots in the caudal fin may form vertical bars; this is never the case in *A. elegans*.

Both species may show narrow vertical dark red bars on the flanks, but in *A. elegans* these bars may run all over the flanks, whereas in *A. pseudoelegans* these bars in most cases only cover the ventral part of the flanks, and dorsally frequently with nearly regular rows of red dots.

Description. See Figures 2–3 for general appearance and colour pattern, Table 1 for morphometric, and Table 2 for meristic data of the type series. *Aphyosemion pseudoelegans* is a slender, elongate species. It shows strong sexual dimorphism, males more colourful, unpaired fins larger and with fin extensions. Relatively large species within *Aphyosemion* (up to 51.4 mm TL), laterally slightly compressed; dorsal profile slightly convex, greatest body depth approximately anterior or at pelvic fin insertion. Ventral profile slightly convex from head to end of anal fin, straight or slightly concave on caudal peduncle. Caudal peduncle slender, peduncle depth is 1.5–1.9 times in length.

Snout slightly rounded, mouth directed upwards, lower jaw longer than upper jaw. Dentary with outer row of large and inner irregular rows of smaller unicuspid, curved teeth; premaxilla with some larger and several smaller unicuspid and curved teeth.

Frontal (after Scheel, 1968) or nasal (after van Bergeijk & Alexander, 1962) neuromasts in separate grooves, preopercular canal with six pores.

Scales cycloid, entirely scaled except ventral surface of head; frontal squamation of G-type; scales on mid-longi-

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Fig. 4. **A)** Male of *Aphyosemion elegans*, commercial import (2006) from the Tshuapa River near Boende, not preserved. **B)** Female *Aphyosemion elegans*, commercial import (2006) from the Tshuapa River near Boende, not preserved. Photographed by H. Ott.

tudinal series 28–30, with two scales posterior to hypural plate; seven transversal scales, 12 scales around caudal peduncle.

Small dorsal fin with 8–9 fin rays, first dorsal fin ray inserts above 8–10th anal fin ray; anal fin with 13–15 rays; posterior dorsal and anal fin rays slightly elongated in males; caudal fin with 24–28 rays, with extensions on upper and lower fin rays.

X-ray images of three males from comparative material (MRAC 37840–843) show 29–30 vertebrae and well separated upper and lower hypural bones.

Live colouration. Males (Fig. 2A). Flanks golden to brown, with yellow to bluish-green iridescence. Most flank scales with a red dot. These dots are mainly situated at the posterior edge of the scales and usually form up to five parallel, interrupted stripes. Many populations have in addition scales that have the red dots situated at the anterior edge of the scale. This causes, in combination with the adjacent scales above and below with red dots at the posterior edge, vertical narrow red bars. Three red streaks on opercle in an approximate 45° angle. One or two infrabuccal bands present on the lower jaw. Red dots underneath the eye often united in a red streak. Pectoral fin translucent yellow to orange with a whitish or light yellow edge; red dots present, sometimes concentrated near the yellow edge forming a red band. Anal fin light blue or light yellow, provided with many red dots and/or inter-radial red stripes, sometimes with a yellow or light blue margin. Dorsal fin predominantly dark red to almost black, with a narrow light band at the base and edged with a white, yellow, blue or nearly black band, depending on ex-

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posure to light. Central part of caudal fin with many red dots and/or inter-radial stripes. Upper margin yellow or whitish to light blue, sub-marginal band dark red, lower margin with broad light sub-marginal band and narrow dark red marginal band. In some populations, including the types, this red band is interrupted or absent.

Females (Fig. 2B). Flanks grey with strong red reticulation; red streaks on opercle reduced, often only middle streak clearly visible; infra-buccal band absent. All fins transparent; edge of anal fin and distal part of ventral fin light blue or white; small red dots on anal fin, large red dots and/or short inter-radial stripes in dorsal fin; small red dots on anterior dorsal edge and at base of caudal fin.

Colour in ethanol. The types from Boende and the comparative material from Bokuma show the typical pattern of preserved *Aphyosemion* species, in which the red pigmentation pattern, after preservation in formalin and transfer into ethanol, leaves corresponding patterns of lighter areas than the body colouration (Van der Zee & Sonnenberg 2010). The dark red band in the dorsal fin becomes nearly black, grey, or dark brown. After eleven years in 96% ethanol the red colour of the ZSM paratypes is still present and resembles the live colour pattern except for the iridescence and the dark red band in the dorsal fin and upper caudal fin that became nearly black. This is also the case in one collection originating from Boende and two of four collections coming from Ikela. Material collected here in 1958 and 1972 has the red pigmentation perfectly preserved, whereas material collected in 1955 and 1959 shows the typical colouration of preserved *Aphyosemion* specimens. Interestingly, the colouration of the formerly dark red dorsal in *A. pseudoelegans* leaves, when preserved in ethanol, a darker area than the red pigment on the body; whereas red pigment on the body and dorsal fin leaves lighter areas in *A. elegans* (see Fig. 3). Eventually the red pigment of the dorsal fin differs or the colour is based on a combination of the more common red pigment as in other species and a darker pigment, which becomes nearly black and later greyish in preservation.

Habitat and Distribution. Like all members of the genus *Aphyosemion, A. pseudoelegans* inhabits shallow and small brooks under forest cover. Currently known collections indicate, that *A. pseudoelegans* is restricted to tributaries on the left bank of the middle Congo basin, also known as the Cuvette or Cuvette centrale. This area is enclosed by the Congo River in the north, east, and west, and by the Kasai River in the south of the Democratic Republic of Congo (Fig. 1). *Aphyosemion pseudoelegans* is present in the Tshuapa, Lomani and Lokoro drainages.

Etymology. The name *Aphyosemion pseudoelegans* refers to the misidentification as *A. elegans*, a similar species, but lacking the typical dark red dorsal fin and the asymmetric caudal fin colour pattern; from the Greek ψευδής , meaning lying or false, the latter is our intended translation.

DISCUSSION

The study of the killifishes of the Congo Basin by the senior author indicates, that there are still several undescribed species in museum collections and the collections made recently indicate, that further undescribed species are still to be discovered in this large and mostly not well sampled part of Africa (see also Sonnenberg et al. 2011, Van der Zee & Sonnenberg 2010, 2011).

We recently made the assumption that *A. elegans* and *A. pseudoelegans* represent different species (Van der Zee & Sonnenberg 2011). Both were kept and bred by killifish hobbyists for several years and their observations indicate that *A. pseudoelegans* is not simply a case of polychromy of *A. elegans*, which is supported by recently published DNA data (Van der Zee & Sonnenberg 2011). In addition, we did not find any indication of potential hybrids in the studied material of both species. The diagnosis of *A. pseudoelegans* from *A. elegans* is mainly based on colour pattern differences of unpaired fins. In general, this genus has a comparatively high variability in colouration (see also Van der Zee & Sonnenberg 2011), but beside details, the general pattern of fins, especially the order of dark and light marginal and submarginal bands is a comparatively stable character according to our observations. *Aphyosemion elegans* and *A. pseudoelegans* can easily be distinguished by their different, stable pattern of light and dark areas, and less by their similar, but not identical, body colour pattern, which in addition can also be variable between different populations of a species. For nothobranchiids it is assumed that male colouration is important for female mate choice within and between species (Amiet 1987; Brosset & Lachaise 1995; Kullmann & Klemme 2007) and Van der Zee et al. (2007) presume that especially the colour pattern of the caudal peduncle and unpaired fins might have an important role.

With the description of *A. musafirii* we presented a preliminary mtDNA analysis for some species of *Aphyosemion*, including *A. pseudoelegans* (Van der Zee & Sonnenberg 2011). We indicated an incongruence of mtDNA results and phenotype within the samples of the Cuvette centrale. This is also true for the *A. pseudoelegans* samples, which were labelled within this phylogeny (Van der Zee & Sonnenberg 2011, fig.9) as *A.* sp. Cuvette (sample RS1019) or *A.* sp. aff. *elegans* (samples RS1508 & RS1509). These samples turn out in different parts of the phylogeny, but are grouped together in a preliminary analysis of a fragment of the nuclear LSU (unpublished data). Additionally, a population originating from Bandundu belongs to *A. pseudoelegans* according to

its phenotype with the diagnostic dark red dorsal fin. This is well visible on available pictures and specimens deposited in the MRAC from a collection in 1982. However, the published mtDNA cytochrome b sequence (Murphy & Collier 1999, as *Aphyosemion cognatum*) deviates from any of our sequences (results not shown).

Due to some incongruencies between mtDNA, nuclear DNA, and phenotype we hesitate at the moment to discuss the phylogenetic position of the different species and the cause of such incongruencies, until further samples and DNA data are available. A potential cause for incongruencies can be mitochondrial introgression, which we discussed in the recent publication (Van der Zee & Sonnenberg 2011) and which is known to occur in the nothobranchiid genus *Chromaphyosemion* (Sonnenberg 2007). But in the case of incongruent DNA and phenotype data, it has to be considered that also nuclear DNA and mtDNA can be affected. An example of homogenization of nuclear rRNA genes in F1 hybrids is given by Wang et al. (2010). This would make it impossible to detect such crosses, which usually is possible with nuclear sequence data (see e.g. Sonnenberg et al. 2007). In addition, hybrid speciation as in some African cichlids (Schliewen & Klee 2004; Schwarzer et al. 2011) might also not be excluded, especially as the species involved are in contact within the Cuvette centrale. The available data indicate a complex pattern within the *Aphyosemion* of the Congo Basin, and more data will be necessary to understand the evolution and phylogeography of these fishes (Van der Zee & Sonnenberg 2011).

Currently, it appears that *A. pseudoelegans* is restricted to the Cuvette central on the left bank of the Congo, whereas *A. elegans* is also found further north and on the right bank of the Oubangui in the Republic of Congo, but not in the south and southeast of the Cuvette (Fig. 1). Their distribution areas overlap at least in the region of the lower Tshuapa River, were they can occur in sympatry or close parapatry, e.g. around Boende (Fig. 1). *Aphyosemion pseudoelegans* can also be found in syntopy with other *Aphyosemion*, e.g. at Ikela with an undescribed species only known from preserved specimens in the MRAC, and near Lui Kotale with *A.* sp. aff. *castaneum* (see Van der Zee & Sonnenberg 2011).

COMPARATIVE AND ADDITIONAL NON-TYPE MATERIAL

Aphyosemion elegans (Boulenger, 1899): MRAC 990–992, Syntypes, Democratic Republic of Congo, Équateur Province, Tshuapa Basin, Bikoro, coll. P. Delhez, no year; MRAC 993, Syntype, Democratic Republic of Congo, Équateur Province, Tshuapa Basin, Coquilhatville (present Mbandaka), coll. P. Delhez, no year; MRAC 1488, Democratic Republic of Congo, Uélé (not specified), coll. A. Hutereau, 5.I.1905; MRAC 21628, Democratic Republic of Congo, Équateur Province, Tshuapa Basin, Eala, coll. Van Oye, 2.V.1923; MRAC 21636–639, Democratic Republic of Congo, Orientale Province, Mondimbi, coll. J. Ghesquière, XI.1927; MRAC 21642–648, Democratic Republic of Congo, Équateur Province, Tshuapa Basin, Eala, coll. Van Oye, 2.V.1923; MRAC 21649–653, Democratic Republic of Congo, Orientale Province, Mondimbi, coll. J. Ghesquière, XI.1927; MRAC 21670–682, Democratic Republic of Congo, Équateur Province, Tshuapa Basin, Eala, coll. Van Oye, 2.V.1923; MRAC 21683–697, Democratic Republic of Congo, Équateur Province, Tshuapa Basin, Eala, coll. Van Oye, 2.V.1923; MRAC 23539–546, Democratic Republic of Congo, Équateur Province, Tshuapa Basin, Eala, coll. Van Oye, 2.V.1923; MRAC 44888–894, Democratic Republic of Congo, Équateur Province, Sources à Gemena, coll. P. Henrard, 1935; MRAC 45973–999, Democratic Republic of Congo, Équateur Province, Tshuapa Basin, Eala, coll. J. Ghesquière, IV.1936; MRAC 46000–46049, Democratic Republic of Congo, Équateur Province, Tshuapa Basin, Eala, coll. J. Ghesquière, IV.1936; MRAC 72763, Democratic Republic of Congo, Orientale Province, Buta, coll. J. Hutsebaut, 1949; MRAC 79229–79236, Democratic Republic of Congo, Équateur Province, Tshuapa Basin, Bokuma, coll. P. Lootens, VII.1952; MRAC 80778–80780, Democratic Republic of Congo, Équateur Province, Tshuapa Basin, Bokuma, coll. P. Lootens, 1952; MRAC 93724–93773, Democratic Republic of Congo, Équateur Province, Tshuapa Basin, Bokuma, coll. P. Lootens, III.1954; MRAC 96831–841, Democratic Republic of Congo, Équateur Province, Tshuapa Basin, Bonguma 8 km S of Bokuma, coll. P. Lootens, 1952; MRAC 98696–699, Democratic Republic of Congo, Équateur Province, Tshuapa Basin, Bonguma, coll. P. Lootens, 1955; MRAC 73-23-P-11233–302, Democratic Republic of Congo, Équateur Province, Tshuapa Basin, Boende, coll. R. Philippe, VIII.1956.

Aphyosemion pseudoelegans: AMNH I-252189, Democratic Republic of Congo, Équateur Province, riv. Ta'Simon a Boaugi, coll. R. Monsembula, 23.V.2010; MRAC 21634–635, Democratic Republic of Congo, Équateur Province, Flandria, coll. G. Hulstaert, IV.1928; MRAC 30113, Democratic Republic of Congo, Équateur Province, riv. Momboyo, Flandria, coll. G. Hulstaert, 15.IV.1930; MRAC 30123, Democratic Republic of Congo, Équateur Province, riv. Momboyo, Flandria, coll. G. Hulstaert, 15.IV.1930; MRAC 30130–134, Democratic Republic of Congo, Équateur Province, riv. Momboyo, Flandria, coll. G. Hulstaert, 18.X.1931; MRAC 30203–211, Democratic Republic of Congo, Équateur Province, riv. Momboyo, Flandria, coll. G. Hulstaert, 16.IV.1931; MRAC 30222–259, Democratic Republic of Congo, Équateur Province, riv. Momboyo, Flandria, coll. G. Hulstaert, 1931; MRAC 37840–843, Democratic Republic of Congo, Équateur Province, riv. Momboyo, Flandria, coll. G. Hulstaert, 15.VII.1931; MRAC 47823–830, Democratic Republic of Congo, Équateur Province, Tshuapa Basin, Flandria, coll. G. Hulstaert, 1936; MRAC 72531–545, Democratic Republic of Congo, Équateur Province, riv. Ilolo, Flandria, coll. G. Hulstaert, 13.II.1948; MRAC 79237, Democratic Republic of Congo, Équateur Province, Tshuapa Basin, Bokuma, coll. P. Lootens, VII.1952; MRAC 79908–909, Democratic Republic of Congo, Équateur Province, Tshuapa Basin, Bokuma, coll. P. Lootens, 10.VII.1952; MRAC 80709–80777, Democratic Republic of Congo, Équateur Province, Tshuapa Basin, Bokuma, coll. P. Lootens, 1952; MRAC 96830, Democratic Republic of Congo, Équateur Province, Banguma a 8 km Sud de Bokuma, coll. P. Lootens, 1954; MRAC 96688–693, Democratic Republic of Congo, Équateur Province, Tshuapa Basin, Bokuma, coll. P. Lootens, I.1954; MRAC 98700–701, Democratic Republic of Congo, Orientale Province, Tshuapa River, Ikela, coll. P. Lootens,

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15.IV.1955; MRAC 99000, Democratic Republic of Congo, Équateur Province, Tshuapa Basin, Marais de la Kea, Boende, coll. R. Philippe, IV.1955; MRAC 99753, Democratic Republic of Congo, Équateur Province, riv. Momboyo, Loselinga, coll. G. Hulstaert, 5.V.1955; MRAC 99746–752, Democratic Republic of Congo, Riv. Loe, unknown location, coll. G. Hulstaert, 16.V.1955; MRAC 101891–915, Democratic Republic of Congo, Équateur Province, Tshuapa Basin, marches around Boende, coll. R. Philippe, VII.1955; MRAC 131305–311, Democratic Republic of Congo, Orientale Province, Tshuapa River, Losaka stream, Ikela, coll. H. Matthes, 9.IX.1959; MRAC 175812–842, Democratic Republic of Congo, Équateur Province, Tshuapa Basin, Boende, coll. P. Lootens, II.1966; MRAC 178018–023, Democratic Republic of Congo, Équateur Province, Tshuapa Basin, Boende, coll. P. Brichard, 1969; MRAC 73-23-P-11040–42, Democratic Republic of Congo, Équateur Province, Tshuapa Basin, Boende, coll. R. Philippe, 1956; MRAC 73-23-P-11043–232, Democratic Republic of Congo, Équateur Province, Tshuapa Basin, Boende, coll. R. Philippe, VI.1956; MRAC 73-23-P-11303–542, Democratic Republic of Congo, Équateur Province, Tshuapa Basin, Boende, coll. R. Philippe, IX.1956; MRAC 75-35-P-37–40, Democratic Republic of Congo, Orientale Province, district Ikela, Yetsi, coll. P. Lootens, VI-II.1972; MRAC 79-09-P-732–740, Democratic Republic of Congo, Orientale Province, Ikela territory, Yayama, coll. J. Lambert, 17.V.1958; MRAC 84-25-P-3, Democratic Republic of Congo, Équateur Province, Boteka, coll. P. Lootens, I.1984; MRAC 85-47-P-1–4, Democratic Republic of Congo, Bandundu Province, Kasai drainage, Bandundu, coll. K. Klute, X.1982; MRAC 2010 Congo Expedition, Location 66, stream near Lieki opposite Yangambi, coll. J. Snoeks & E. Vreven, 27.V.2010.

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Description of *Scriptaphyosemion wieseae* (Cyprinodontiformes: Nothobranchiidae), a new species from northern Sierra Leone

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Abstract. *Scriptaphyosemion wieseae*, new species, is described from collections in northern Sierra Leone. Results of a small DNA study indicate, that *S. bertholdi* from the southeastern part of the country is the closest relative. Both species can be distinguished by male and female color pattern and male caudal fin shape.

Résumé. *Scriptaphyosemion wieseae*, une nouvelle espèce, est décrite du Nord de la République de Sierra Leone. Le résultat d'une petite étude moléculaire ADN montre que son espèce sœur est *S. bertholdi*, présente au Sud-Est du pays. Les deux espèces se distinguent par les couleurs du mâle et de la femelle et par la forme de la nageoire caudale du mâle.

Key words. Upper Guinean ichthyofaunal province, taxonomy, DNA, phylogeny.

INTRODUCTION

The West African killifish genus *Scriptaphyosemion* Radda & Pürzl, 1987 is relatively species rich, compared to the closely related genera *Archiaphyosemion* Radda, 1977, *Callopanchax* Myers, 1933, and *Nimbapanchax* Sonnenberg & Busch, 2009. At present 18 specific names are available in *Scriptaphyosemion* (Eschmeyer 2011; Huber 2007; Lazara 2001), but only 10 (Huber 2007; Wildekamp & Van der Zee 2003) to 13 (Costa 2008; Lazara 2001) species are currently accepted as valid, depending on author and concept (Huber 2007; Eschmeyer 2011; Lazara 2001; Scheel 1990; Wildekamp 1993). Among the West African killifish genera, species number in *Scriptaphyosemion* is only exceeded by the Upper Guinean species of the related genus *Epiplatys* Gill, 1862 (Costa 2008; Huber 2007; Wildekamp & Van der Zee 2003).

In nothobranchiid killifishes, most species are diagnosed by male color pattern (Amiet 1987; Sonnenberg 2007), which is, however, increasingly supplemented by molecular approaches (e.g. Agnèse et al. 2009; Legros et al. 2005; Legros & Zentz 2007a, b; Sonnenberg 2007, 2008; Sonnenberg & Blum 2005; Sonnenberg & Busch 2009, 2010; Sonnenberg et al. 2006, 2011; Van der Zee & Sonnenberg 2011). In *Scriptaphyosemion*, female color pattern has also been used as character for diagnosing species or groups of species (Roloff 1971a).

In most species of *Scriptaphyosemion*, interspecific variance in male color pattern is accompanied by intraspecific variance between and within populations, a phenomenon which may confuse species identification; however, some of the most variable species might be composed of more than one species (see e.g. figures or drawings in Seegers 1997; Wildekamp 1993). This combination of intraspecific variability, inclusion of probably different species under one taxon, and the lack of a specific diagnosis in many species descriptions contributed to some confusion in *Scriptaphyosemion* taxonomy (see e.g. Scheel 1990). More than a decade ago, Murphy et al. (1999) published the first molecular genetic phylogeny of *Scriptaphyosemion*, based on the sequences of the partial cytochrome b and 12S rRNA genes and including eleven species. This phylogeny gave a first insight into the relationships and an additional set of independent characters for further taxonomic and phylogenetic research.

Species diversity of *Scriptaphyosemion* is highest in Sierra Leone, Liberia, and Guinea. However, the distribution area also includes Burkina Faso, Gambia, Guinea-Bissau, Ivory Coast, Mali, and Senegal (Huber 2007; Paugy et al. 1990; Teugels et al. 1988; Wildekamp 1993; Wildekamp & Van der Zee 2003). In Sierra Leone, *Scriptaphyosemion* species are mainly known from the coastal lowland, the northern and eastern killifish fauna is only little known (Etzel 1977, 1978a, b, 1984; Huber 2007; Wildekamp 1993; Wildekamp & Van der Zee 2003).

In 1993, the second author collected together with B. Wiese nothobranchiids in the northern part of Sierra Leone (Busch 1995a), including a probably new species near

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Table 1. List of specimens used for the DNA analyses with locality data and GenBank accession numbers (ND2+tRNAs, mtLSU rDNA, nLSU rDNA). * Sequences published in Sonnenberg & Busch (2009).

Species	sample	Country	Collection locality	GenBank acc. no.
Epiplatys sexfasciatus	RS1364	Gabon	G 02/91	JX124276, FJ872035*, FJ872049*
Scriptaphyosemion bertholdi	RS1402	Sierra Leone	SL 93/51	JX124261, JX124233, JX124247
S. brueningi	RS1377	Sierra Leone	SL 03/04	JX124262, JX124234, JX124248
S. brueningi	RS1403	Sierra Leone	SL 89, Perie	JX124263, JX124235, JX124249
S. cauveti	RS1680	Guinea	GM 97/05	JX124264, JX124236, JX124250
S. chaytori	RS1379	Sierra Leone	SL 93/23 Ngabu	JX124265, JX124237, JX124251
S. fredrodi	RS1398	Sierra Leone	SL 89, Matanga	JX124266, JX124238, JX124252
S. geryi	RS1381	Sierra Leone	SL 03/09, Robis 1	JX124267, FJ872033*, FJ872047*
S. guignardi	RS1380	Guinea	GM 97/13	JX124268, JX124239, JX124253
S. liberiense	RS1757	Liberia	L 97	JX124269, JX124240, JX124254
S. roloffi	RS1376	Sierra Leone	SL 03/10	JX124270, JX124241, JX124255
S. schmitti	RS1755	Liberia	RL 83/121	JX124271, JX124242, JX124256
S. sp.	RS1378	Sierra Leone	SL 03/18	JX124272, JX124243, JX124257
S. wieseae	RS1382	Sierra Leone	SL 03/16	JX124273, JX124244, JX124258
S. wieseae	RS1686	Sierra Leone	SL 03/15	JX124274, JX124245, JX124259
S. wieseae	RS1687	Sierra Leone	SL 03/17	JX124275, JX124246, JX124260

Lenghe Curoh. In 2003 they revisited this locality and found two additional collection localities of this species (Fig. 1). Preliminary crossing experiments by engaged aquarists (Vandersmissen 2003) indicated its probable incompatibility with *S. bertholdi* (Roloff, 1965), which was considered to be the potentially closest relative. Here, we provide a formal species description and present the phylogenetic position of the new species within *Scriptaphyosemion*, based on mitochondrial and nuclear DNA sequences.

MATERIAL AND METHODS

The species description is based on collections made in Sierra Leone by the second author and B. Wiese during their second visit in this area in November 2003. Specimens were deposited in the Royal Museum for Central Africa (MRAC, Tervuren, Belgium), the Zoologische Staatssammlung München (ZSM, Munich, Germany), and the Zoologisches Forschungsmuseum Alexander Koenig (ZFMK, Bonn, Germany).

For counts and measurements, see Sonnenberg & Busch (2009, 2010). All measurements were taken with a digital caliper, partly under a dissecting microscope, to the nearest 0.1 mm. Measurements, including those of the head, are presented as percentages of standard length (SL). The head region of one specimen was scanned with a Scanco viva CT40 at the Max-Planck-Institut für Evolutionsbiologie in Plön, digital X-ray images were made with a Faxitron LX-60 Digital Specimen Radiography System at the ZFMK. Fin rays of unpaired fins were counted on digital X-ray images; the relative position of the first dorsal fin ray to the anal fin (D/A) is estimated following Sonnenberg & Schunke (2010). Nomenclature of the neuromast system on the head follows Scheel (1968), for supraorbital (or frontal) squamation Hoedeman (1958). Male and female color patterns are compared with that given in the respective description and on pictures or drawings published in the literature.

As species concept we employ the pragmatic approach of Moritz et al. (2000) and recognize species by diagnostic combinations of characters.

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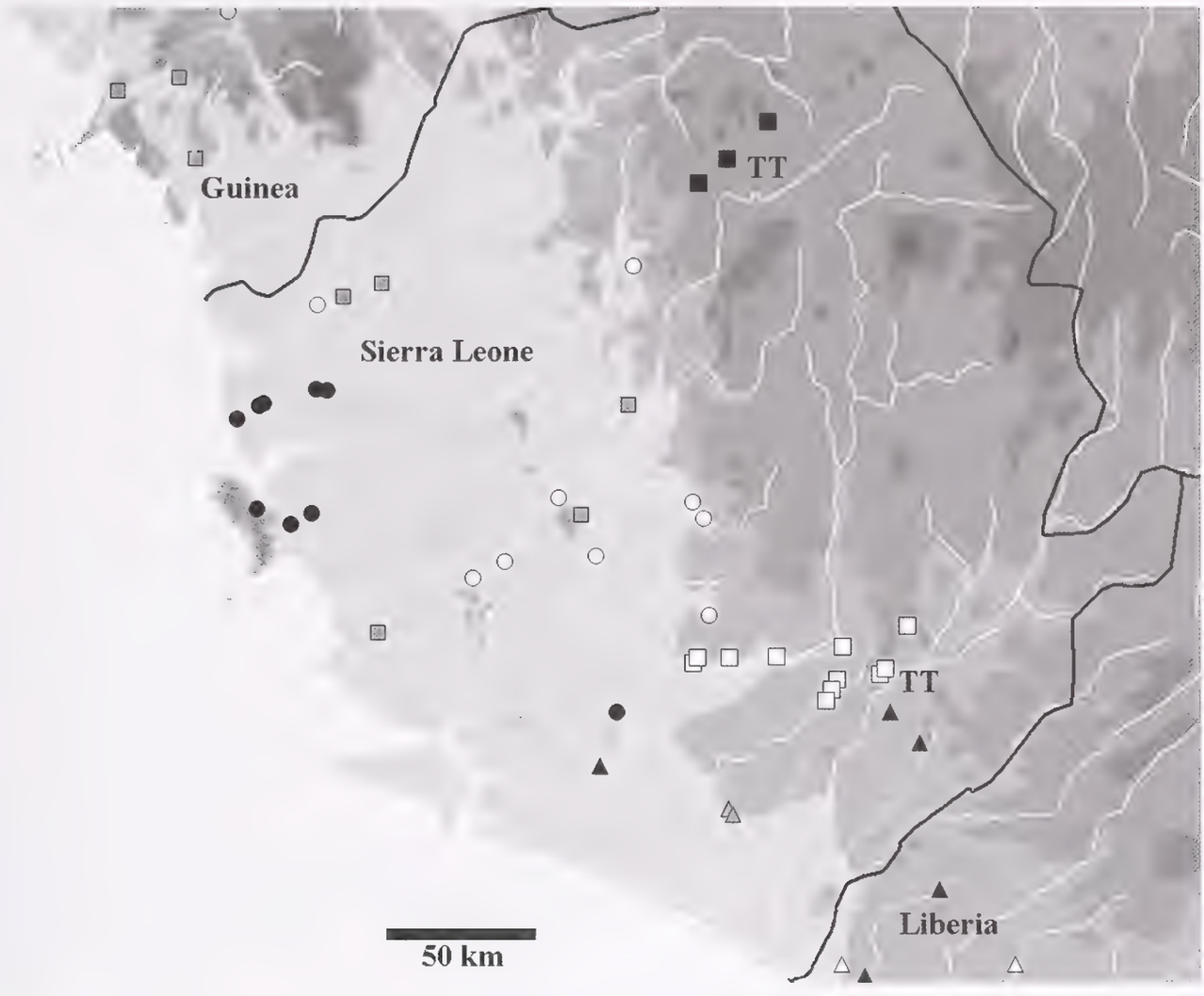

Fig. 1. Distribution map of *Scriptaphyosemion* in Sierra Leone based on data from Huber (2007) and own data of the second author. White square: *S. bertholdi;* black triangle: *S. brueningi;* white circle: *S. chaytori;* dark grey triangle: *S. fredrodi;* dark grey square: *S. geryi;* light grey circle: *S. guignardi;* white triangle: *S. liberiense;* black circle: *S. roloffi;* black square: *S. wieseae.* TT marks the type localities of *S. bertholdi* and *S. wieseae.*

A DNA dataset was prepared for 15 *Scriptaphyosemion* specimens, including 11 species, and *Epiplatys sexfasciatus* Gill, 1862 as outgroup. We sequenced the complete mitochondrial ND2 gene and adjacent tRNAs, and fragments of the mitochondrial and nuclear LSU rDNA genes. Parts of the sequences were published in earlier papers of the authors; all samples are listed with GenBank accession numbers and collection locality in Table 1. For details on the DNA methods, see Sonnenberg & Busch (2009, 2010) and Sonnenberg et al. (2007).

Abbreviations used in Table 2 and Figures 2–3: BER = *S. bertholdi*, BRU = *S. brueningi* (Roloff, 1971b), CAU = *S. cauveti* (Romand & Ozouf, 1995), CHY = *S. chaytori* (Roloff, 1971a), FRE = *S. fredrodi* (Vandersmissen et al., 1980), GER = *S. geryi* (Lambert, 1958), GUI = *S. guignardi* (Romand, 1981), LIB = *S. liberiense* (Boulenger, 1908), ROL = *S. roloffi* (Roloff, 1936), SMI = *S. schmitti* (Romand, 1979), Ssp = *S.* sp. SL 03/18, WIE = *S. wieseae*, new species, SEX = *E. sexfasciatus*.

Sequences were aligned with ClustalX 1.8 (Thompson et al. 1997), checked by eye, and merged in a single alignment in BioEdit 7.0.5.3 (Hall 1999). As the ND2 sequences of three species are not complete, missing sites were filled with N [*S. liberiense* (560 bp), *S. schmitti* (616 bp), and *S. cauveti* (58 bp)].

The protein coding gene was translated into the corresponding amino acid sequence to check for a functional coding sequence, and base composition of mitochondrial sequences was estimated with MEGA 4.1 beta (Tamura et al. 2007). Uncorrected p-distances with pairwise exclusion of missing data were calculated in MEGA 4.1 beta (Tamura et al. 2007). Number of constant, variable, and informative characters were estimated with PAUP 4.0b10 (Swofford 1998).

Data were analyzed using a maximum parsimony (MP) and a Bayesian approach (BA). Maximum parsimony analyses were performed with PAUP 4.0b10 (Swofford 1998) with the exclusion of uninformative positions and

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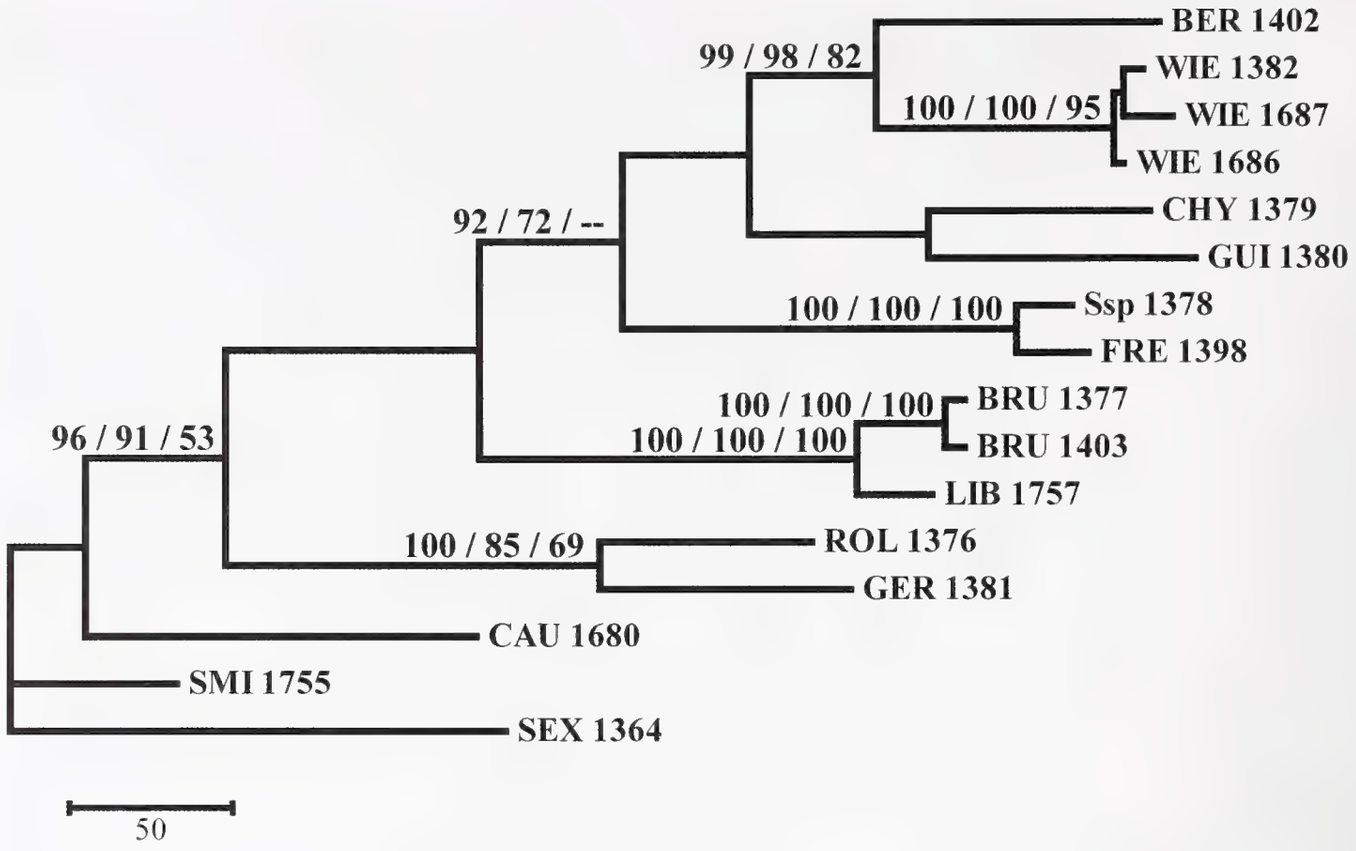

Fig. 2. Results of the maximum parsimony analyses. Shown is one out of three equally short trees from the analysis with the complete dataset. Values left to nodes are the corresponding bootstrap values of all three analyses (complete dataset / third protein coding position excluded / alignment columns with missing data excluded). Values for nodes were only given, if at least one analysis has a bootstrap support above 75 %. Tree length = 1262, consistency index (CI) = 0.5166, homoplasy index (HI) = 0.4834, retention index (RI) = 0.5570, rescaled consistency index (RC) = 0.2878.

gaps coded as fifth character, heuristic tree searches were performed with random addition of sequences for 1,000 replicates. Bootstrap tests were performed with random addition of sequences for 100 replicates and 10,000 bootstrap replicates. Three different analyses were made, one with the complete dataset, one with the exclusion of third protein coding positions, and a third with exclusion of regions, in which one of the above listed specimens has missing data. Otherwise, all parameters were identical.

Bayesian analyses were performed with MrBayes 3.1.2 (Huelsenbeck & Ronquist 2001), data were partitioned in mitochondrial non protein coding regions (tRNA, mtLSU), protein coding regions (ND2), and the nuclear LSU sequences. Number of generation was set to 10,000,000 with sampling of every 1,000 generations and the results of the first 10% of the generations were discarded as burn-in time after checking that the runs had reached the stationary phase at this point. Four analyses were performed: the two alignments, one with the complete data set and one with the exclusion of regions, in which one of the above mentioned specimens has missing data, were both performed with NST=2 and NST=6.

All trees were rooted with *Epiplatys sexfasciatus* as outgroup. Only nodes with bootstrap support values ≥ 75% or posterior probabilities ≥ 0.95 were considered as supported by the data. Nodes below these values were considered as unsupported by the data and not resolved.

RESULTS

DNA Analysis. (Figs 2–3, Table 2). The complete alignment of the ND2, tRNA, and both LSU sequences has a length of 3199 bp including alignment introduced gaps for a total of 16 specimens (503 bp tRNAs, 1047 bp ND2, 481 bp mtLSU rDNA, 1168 bp nLSU rDNA). Of these, 2278 bp are constant, 456 bp variable but uninformative, and 465 bp parsimony informative. The ND2 sequence translates into 349 amino acids with no unexpected stop codon, the base composition of all mitochondrial genes shows the typical base composition for this organelle genome with an anti-G bias (Zhang & Hewitt 1996). Average uncorrected pairwise distance for all sequences is 7.4 %, maximum observed distance is 16.6 % between outgroup and ingroup specimens, maximum observed distance between ingroup specimens is 9.0 %, further details are given in Table 2.

Table 2. Uncorrected p-distances with pairwise exclusion of missing data for the complete dataset / the mitochondrial ND2+tRNAs / the mitochondrial LSU rDNA / the nuclear LSU rDNA.

sample	BER1401	BRU1377	BRU1403	CAU1680	CAY1379	FRE1398	GER1381	GUI1380	LIB1757	ROL1376	SMI1755	Ssp1378	WIE1382	WIE1686	WIE1687
BRU1377	6.3/ 11.3/ 2.7/ 0.9														
BRU1403	6.2/ 11.0/ 2.7/ 0.9	0.4/ 0.9/ 0.0/ 0.0													
CAU1680	8.3/ 14.5/ 3.6/ 2.0	8.2/ 14.6/ 3.8/ 1.6	8.2/ 14.4/ 3.8/ 1.6												
CAY1379	5.2/ 8.2/ 2.5/ 2.0	7.2/ 12.5/ 3.6/ 1.4	7.0/ 12.2/ 3.6/ 1.4	8.6/ 14.2/ 4.6/ 2.8											
FRE1398	5.3/ 8.9/ 3.4/ 1.3	6.8/ 12.1/ 3.4/ 0.9	6.6/ 11.7/ 3.4/ 0.9	8.6/ 15.1/ 4.0/ 1.8	6.1/ 9.9/ 4.6/ 1.3										
GER1381	7.5/ 12.4/ 3.6/ 2.3	7.9/ 13.4/ 4.2/ 1.9	7.7/ 13.0/ 4.2/ 1.9	9.0/ 15.5/ 3.8/ 2.5	7.7/ 12.8/ 4.0/ 2.3	8.2/ 13.8/ 4.0/ 2.2									
GUI1380	5.9/ 9.7/ 3.4/ 1.7	7.5/ 13.0/ 4.6/ 1.3	7.4/ 12.8/ 4.6/ 1.3	8.7/ 15.1/ 4.2/ 2.1	6.2/ 9.9/ 3.8/ 2.0	6.6/ 10.9/ 5.1/ 1.4	8.3/ 13.8/ 4.4/ 2.2								
LIB1757	5.6/ 11.4/ 3.6/ 1.4	2.1/ 4.4/ 1.1/ 0.5	2.1/ 4.3/ 1.1/ 0.5	7.1/ 14.8/ 4.9/ 1.7	6.4/ 12.8/ 4.4/ 1.5	5.6/ 11.8/ 3.8/ 1.0	6.5/ 12.8/ 5.1/ 1.7	6.5/ 12.9/ 5.5/ 1.4							
ROL1376	6.6/ 11.7/ 2.3/ 1.5	6.9/ 12.1/ 3.8/ 0.9	6.9/ 12.1/ 3.8/ 0.9	8.8/ 15.4/ 3.8/ 2.2	6.8/ 12.2/ 2.7/ 1.1	6.9/ 12.4/ 4.0/ 0.7	5.9/ 9.9/ 2.5/ 1.7	7.5/ 12.8/ 4.0/ 1.7	5.9/ 12.3/ 4.6/ 0.8						
SMI1755	6.5/ 11.8/ 4.9/ 2.8	5.9/ 11.0/ 3.8/ 2.4	5.9/ 11.1/ 3.8/ 2.4	5.4/ 9.9/ 4.4/ 2.3	6.4/ 10.9/ 5.3/ 3.1	6.0/ 10.6/ 4.6/ 2.7	6.3/ 11.5/ 4.6/ 2.8	6.7/ 11.9/ 5.9/ 2.7	3.9/ 7.7/ 4.9/ 2.2	5.7/ 10.2/ 4.2/ 2.5					
Ssp1378	5.5/ 9.2/ 3.2/ 0.9	6.6/ 11.9/ 3.2/ 0.9	6.4/ 11.4/ 4.2/ 1.8	8.6/ 15.0/ 4.4/ 1.3	6.1/ 10.1/ 0.6/ 0.0	1.5/ 2.9/ 4.2/ 2.2	7.9/ 13.2/ 5.3/ 1.4	6.6/ 10.7/ 3.6/ 1.0	5.5/ 11.6/ 4.2/ 0.7	6.8/ 11.9/ 5.3/ 2.7	6.1/ 10.6/ 3.2/ 1.3				
WIE1382	2.8/ 4.7/ 0.8/ 1.0	6.4/ 11.8/ 2.3/ 0.6	6.2/ 11.4/ 2.3/ 0.6	8.2/ 14.3/ 3.6/ 1.8	5.3/ 8.5/ 3.0/ 2.0	5.2/ 8.6/ 3.0/ 1.3	7.3/ 12.1/ 3.6/ 2.2	5.8/ 9.5/ 3.8/ 1.5	5.2/ 10.8/ 3.2/ 1.2	6.8/ 11.8/ 2.7/ 1.5	5.8/ 10.5/ 4.4/ 2.6	5.2/ 8.7/ 2.7/ 1.3			
WIE1686	2.7/ 4.5/ 1.1/ 1.0	6.4/ 11.8/ 2.5/ 0.6	6.2/ 11.4/ 2.5/ 0.6	8.2/ 14.5/ 3.4/ 1.8	5.3/ 8.4/ 3.2/ 2.0	5.1/ 8.5/ 2.7/ 1.3	7.4/ 12.4/ 3.4/ 2.2	5.9/ 9.8/ 3.6/ 1.5	5.4/ 11.2/ 3.4/ 1.2	6.5/ 11.4/ 2.5/ 1.5	5.8/ 10.5/ 4.2/ 2.6	5.2/ 8.7/ 3.0/ 1.3	0.5/ 0.9/ 0.2/ 0.0		
WIE1687	3.0/ 5.1/ 1.1/ 0.9	6.5/ 11.9/ 2.5/ 0.7	6.2/ 11.3/ 2.5/ 0.7	8.1/ 14.3/ 3.4/ 1.9	5.3/ 8.4/ 3.2/ 1.9	5.2/ 8.9/ 2.7/ 1.3	7.6/ 12.8/ 3.4/ 2.2	6.1/ 10.1/ 3.6/ 1.6	5.4/ 11.1/ 3.4/ 1.2	6.7/ 11.8/ 2.5/ 1.4	5.8/ 10.4/ 3.8/ 2.8	5.3/ 9.0/ 3.0/ 1.3	0.7/ 1.1/ 0.6/ 0.1	0.7/ 1.2/ 0.4/ 0.1	
SEX1364	16.5/ 24.4/ 13.1/ 6.7	16.2/ 23.9/ 13.5/ 6.6	16.3/ 24.0/ 13.5/ 6.6	16.6/ 24.2/ 14.8/ 7.0	16.5/ 24.4/ 13.3/ 6.7	16.4/ 24.4/ 13.3/ 6.6	16.6/ 24.6/ 13.9/ 6.6	16.6/ 24.6/ 13.9/ 6.6	15.5/ 26.0/ 13.9/ 6.7	16.3/ 24.0/ 13.5/ 6.7	12.3/ 18.4/ 12.4/ 7.0	16.4/ 24.3/ 13.7/ 6.5	16.3/ 24.5/ 12.4/ 6.6	16.2/ 24.3/ 12.4/ 6.6	16.2/ 24.3/ 12.4/ 6.6

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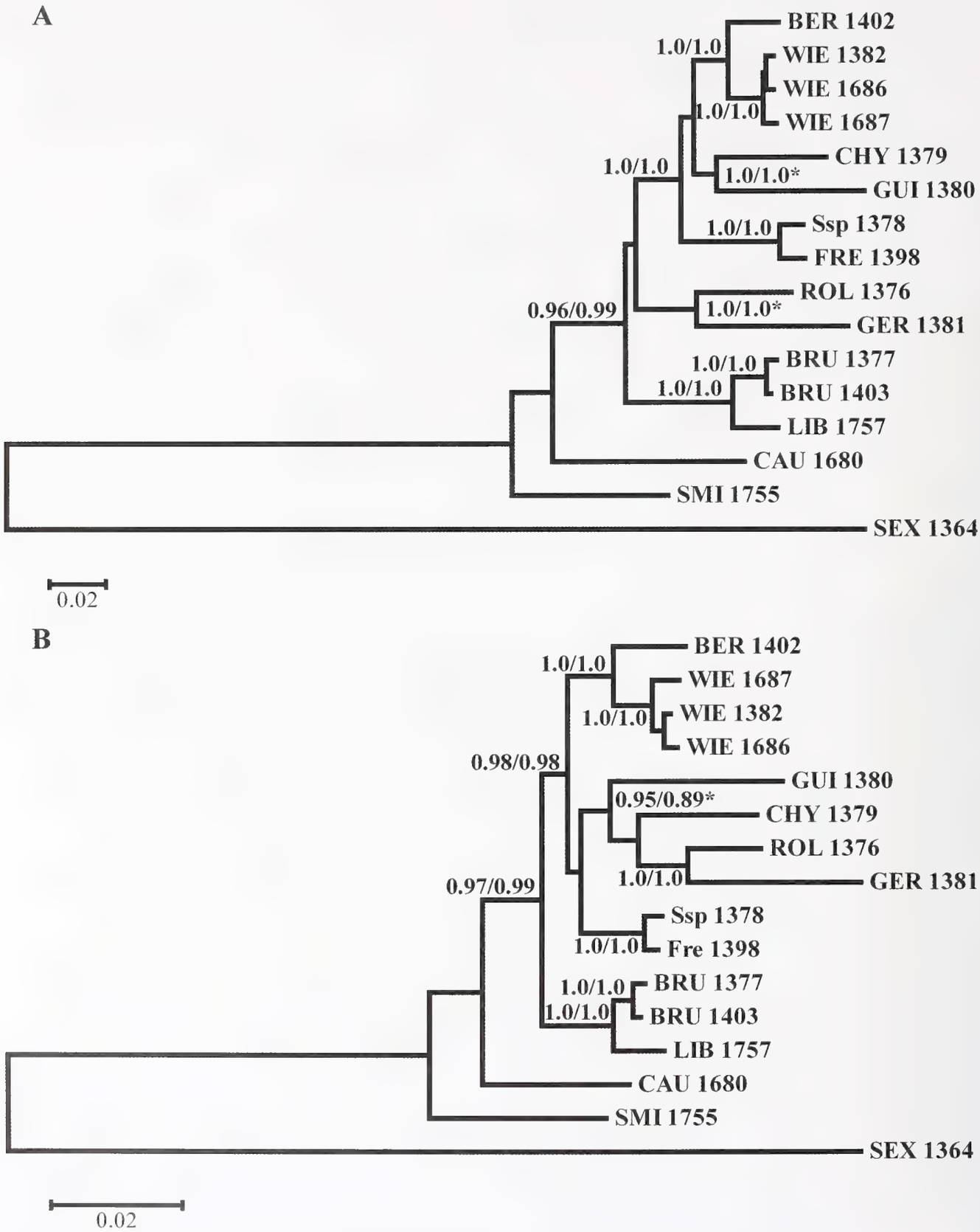

Fig. 3. Results of the Bayesian analyses. Shown is the consensus tree of the analysis with the complete dataset and NST=6 (**A**) and the consensus tree of the dataset with excluded alignment columns with missing data and NST=6 (**B**). Values left to nodes are the corresponding posterior probability values, except for values marked with * which are on the right side of the corresponding node (complete dataset, NST=2 / complete dataset, NST=6 in **A**; alignment columns with missing data excluded, NST=2 / alignment columns with missing data excluded, NST=6 in **B**). Values for nodes were only given, if at least one analysis has a posterior probability above 0.95.

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All three maximum parsimony analyses result in nearly the same tree topology and differ only in branch length and bootstrap support values; here, only one of three shortest trees of the complete dataset is presented (Fig. 2). The Bayesian analyses for the complete and the reduced datasets show slightly different tree topologies, independent if the analyses were performed with NST=6 or 2. Shown are the results for the complete and the reduced dataset of the NST=6 analyses, on the nodes posterior probabilities for both analyses for each dataset are presented if the values are equal to or above 0.95 (Fig. 3 A+B).

Scriptaphyosemion schmitti and *S. cauveti* are supported as basal to all other species of the genus (Figs 2–3). As *S. schmitti* was placed in the study of Murphy et al. (1999) within a clade containing the other *Scriptaphyosemion* species studied, we checked for possible causes of this discrepancy. As the sequences studied here have no overlap with those of Murphy et al. (1999), we compared a cytochrome b fragment of our sample with the data deposited in GenBank. However, both samples differ in only one nucleotide (results not shown), and a Blast search with our analysed sequences (see Table 1) only returned the highest similarity with other *Scriptaphyosemion* sequences. To exclude that the basal position of *S. schmitti* is an artifact due to the missing sequence data, we also performed the analyses with the reduced dataset, which did not contain missing data, but gave the same results (Figs 2–3). However, further samples should be studied for a confirmation of the basal position, especially as this node is supported neither by bootstrap nor posterior probability values.

Our results indicate a closer relationship between *S. liberiense* and *S. brueningi*, *S. roloffi* and *S. geryi*, *S. fredrodi* and a probably undescribed species (see under Discussion), and *S. bertholdi* and *S. wieseae*, new species. A closer relationship between *S. chaytori* and *S. guignardi* occurs in all resulting trees (Figs 2–3), but is well supported only in the Bayesian analyses of the complete dataset. Both species were in addition grouped with *S. roloffi* and *S. geryi* in the analyses of the reduced dataset, but not in the maximum parsimony analyses and the Bayesian analyses of the complete dataset (Figs 2–3).

All analyses support a monophyletic group formed by all *Scriptaphyosemion* except of *S. schmitti* and *S. cauveti* (Figs 2–3). Another well supported subgroup is formed by *S. bertholdi*, *S. wieseae,* new species, *S. chaytori, S. guignardi, S. fredrodi,* and *S.* sp. (see under Discussion); only in the analyses of the reduced dataset *S. roloffi* and *S. geryi* were also included in this group (Fig. 2–3). To this subgroup, *S. brueningi* and *S. liberiense*, probably is the sister group, a hypothesis only significantly supported in the Bayesian analyses (Fig. 3).

The phylogenetic results show that *S. bertholdi* is the well supported sister species to *S. wieseae*, new species, and indicates no closer relationship to other mentioned species. The genetic distance values (Table 2) show a similar divergence as between *S. liberiense* and *S. brueningi*.

***Scriptaphyosemion wieseae*, new species**
(Fig. 4, Table 3)
Scriptaphyosemion sp. Lenghe Curoh: Busch (1995a), Vandersmissen (2003)

Holotype. ZFMK 47680, male, 36.1 mm SL, Sierra Leone, Lenghe Curoh, Sanghi or Sanigi River, field number SL 03/16 (9°28,04' N, 11°40,58' W), E. Busch and B. Wiese, 18. Nov. 2003.

Paratypes. ZFMK 47681–47692, 8 males, 4 females, 19.5–34.7 mm SL, paratopotypes, collected with the holotype.
MRAC B2-06-P-1–2, 1 male, 22.9 mm SL, 1 female, 21.5 mm SL, paratopotypes, collected with the holotype.
ZFMK 47693–47707, 7 males, 8 females, 18.8–41.3 mm SL, Sierra Leone, Fadugu, at the bridge over the Mabakah River, field number SL 03/15 (9°23,52' N, 11°45,76' W), E. Busch and B. Wiese, 18. Nov. 2003.
ZSM 41596 (2), 1 male, 28.4 mm SL, 1 female, 22.3 mm SL, collected with ZFMK 47693–47707.

Non-type DNA samples. RS1686, 1 male, DNA voucher, preserved in 96 % ethanol, collected with ZFMK 47693–47707, field number SL 03/15; RS1382, 2 males, 1 female, DNA voucher, preserved in 96 % ethanol, collected with the holotype; RS1687, 1 male, DNA voucher, preserved in 96 % ethanol, Sierra Leone, Kabala, collected in rice swamp, field number SL 03/17 (9°35' N, 11°33' W), E. Busch and B. Wiese, 18. Nov. 2003.

Diagnosis. *Scriptaphyosemion wieseae* is distinguished from its congeners by a unique combination of male and female coloration characters. Males have a blue body color, red dots on side forming irregular, interrupted red stripes, especially on caudal peduncle a more reticulated pattern, unpaired and pelvic fins centre blue with a narrow blue margin and a broad red submargin, on anal and dorsal fin a small number of basal red blotches, centre of caudal fin with some red blotches, pectoral transparent to orange with a blue margin; females with a dark brown midlateral stripe, interrupted on caudal peduncle, body on lower half of side and ventrally orange vs. a mainly red lateral body color in male *S. cauveti;* head and anterior body yellowish to brownish, unpaired fin margins white or yellow, and pectoral fn margin yellow to orange in male *S. schmitti*; males with more or less regular oblique red bars on side, at least on the caudal peduncle, fin margins, especially of caudal and pectoral, often yellow, and females with dark brown streaks or blotches, similar to the

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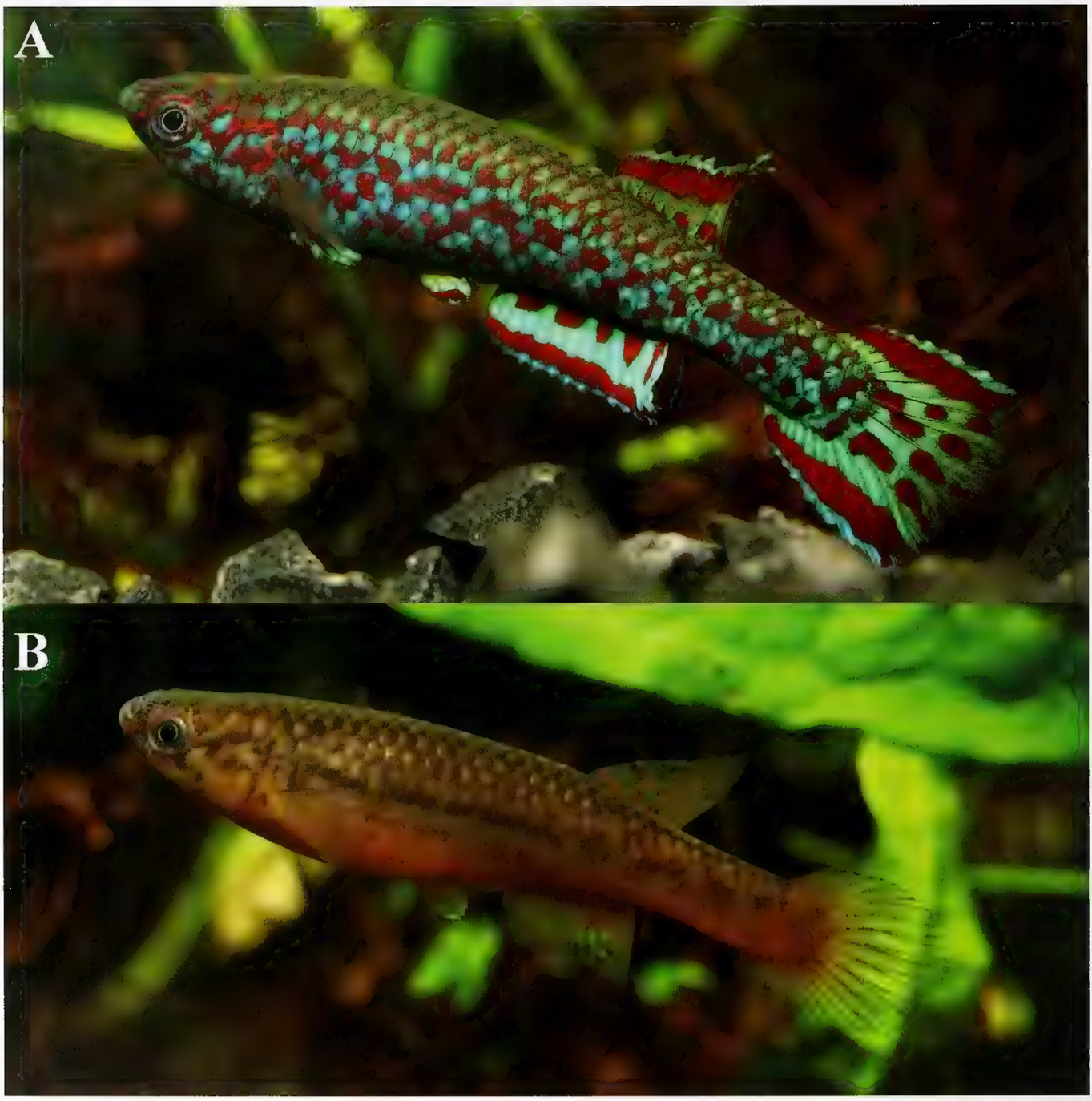

Fig. 4. **A)** Male of *Scriptaphyosemion wieseae*, collection locality SL 03/16, not preserved. **B)** Female of *Scriptaphyosemion wieseae*, collection locality, SL 03/16, not preserved.

red oblique bars of males on side, often with a dark blotch at the root of the caudal in *S. geryi* and *S. roloffi*; males with broad red blotches, often forming broad irregular vertical stripes, caudal fin margins yellow, often with a small white submargin followed by a broader red band, females with irregularly distributed dark brown dots or short oblique streaks or blotches dorsally on the caudal peduncle, a weak anterior dark lateral band, and a dark blotch on the posterior dorsal end of the caudal peduncle at the caudal fin base in *S. brueningi*; often yellow, sometimes whitish caudal fin margins in males, females with irregularly distributed dark brown or red dots on side in *S. chaytori*; males with dark red blotches on side, caudal fin margins whitish to light blue or yellow, pectoral fin margin white, females with dark brown blotches or oblique short streaks on dorsal half of caudal peduncle and a dark blotch on posterior end of caudal peduncle at dorsal base of caudal fin in *S. fredrodi;* males with light blue to blue-green body color, many irregularly distributed small red streaks or dots, submarginal stripes of unpaired fins dark red to nearly black, margins light blue or whitish, sometimes on dorsal and often on anal absent, females with red

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Table 3. Morphometrics of *Scriptaphyosemion wieseae*, new species. Values in the table are based on 15 specimens, for which all measurements and counts were taken (7 of each male and female paratypes). All measurements in percentages of standard length (SL) except standard length in mm. TL = total length, HL = length of head, PD = predorsal fin distance, pPED = prepectoral fin distance, pPD = prepelvic fin distance, pAD = preanal fin distance, DB = greatest body depth, DC = caudal peduncle depth, CL = length of caudal peduncle, BD = base of dorsal fin, BA = base of anal fin, E = eye diameter, I = interorbital width, SD = standard deviation.

	Holotype	Paratypes ♂ mean	Paratypes ♀ mean	all Types mean	all Types range	all Types SD
SL	36.0	25.1	24.7	25.6	21.5–36.0	4.0
TL	119.7	124.4	122.5	123.2	119.7–127.0	2.2
HL	26.3	26.6	26.9	26.7	25.1–28.9	1.3
PD	66.0	65.1	64.9	65.0	61.2–67.8	2.0
pPED	27.7	27.4	27.9	27.6	25.9–29.8	1.1
pPD	45.3	47.2	46.6	46.8	44.7–49.4	1.3
pAD	57.3	57.8	57.5	57.7	54.9–59.8	1.5
DB	19.5	19.8	19.3	19.6	18.7–21.7	0.8
DC	12.3	11.9	11.4	11.7	10.9–12.3	0.5
CL	23.3	22.4	22.5	22.5	21.1–23.6	0.7
BD	17.6	16.3	15.7	16.1	14.4–17.6	1.0
BA	21.1	20.4	19.1	19.8	17.9–21.5	1.0
E	5.4	6.5	6.5	6.4	5.4–7.3	0.5
I	11.2	9.5	9.6	9.7	8.6–1.2	0.6

or dark brown dots on side, on some specimens nearly linear arranged, on others more irregular, in *S. guignardi*; mostly yellow or whitish caudal fin margins in males, irregular dark blotches on dorsal half of side in females, according to the first description (Boulenger 1908), in *S. liberiense*.

Scriptaphyosemion wieseae males (Fig. 4A) differ from its closest relative, *S. bertholdi* (Fig. 5A), by coarser and often denser red pigmentation on body and fins and broader dots or short streaks in the caudal fin, caudal fin truncate vs. small dots on body and fins, especially in the caudal fin, caudal rounded in *S. bertholdi* males. Females of *S. wieseae* (Fig. 4B) have a midlateral more or less complete dark stripe, often interrupted posterior to origin of anal fin on caudal peduncle, ventral half of sides below midlateral dark stripe often intense orange in wild caught specimens or orange-brown in aquarium kept specimens vs. irregularly distributed dark brown dots on scales on dorsal half of side, pale brownish-orange on anterior side in females of *S. bertholdi* (Fig. 5B).

Description. See Figure 4 for overall appearance and Table 3 for morphometric and meristic values of the type series. *Scriptaphyosemion wieseae* shows a strong sexual dimorphism with males more colorful, usually larger, and with slightly extended fin rays in unpaired fins. Body cylindrical, elongate, and laterally slightly compressed. Dorsal profile slightly convex, ventral profile anteriorly slightly convex, slightly concave to nearly straight on caudal peduncle, greatest body depth approximately anterior to origin of pelvic fin.

Snout slightly pointed, mouth directed upwards, lower jaw longer than upper jaw, posterior end of rictus at the level of the dorsal third to centre of eye. Teeth curved and unicuspid, on dentary an outer row of larger teeth, inner rows more or less regular with smaller teeth. Premaxilla with an outer row of larger teeth and a small number of short teeth irregularly on the inner part. Closed frontal neuromast system within one groove, preopercular neuromast system with 5 pores.

Scales cycloid, body and head completely scaled, except for ventral surface of head. Frontal squamation of G-type; scales on lateral line 27–30 + 2–3 scales on caudal fin base. Transverse rows of scales above pelvic fin 9; circumpeduncular scale row 12–14.

Tips of dorsal, anal, and, in some males, also caudal fin slightly pointed, but no filamentous extensions, caudal fin truncate. Fins in females are generally smaller and more rounded. Dorsal and anal fin origin posterior to mid-body. First dorsal fin ray posterior to origin of anal fin, situated above anal fin ray 4–6. Dorsal fin with 12–13 rays, anal with 16–17 rays, caudal fin with 25–28 fin rays. Pectoral fin rounded, fin origin on ventral half of side, just posterior to operculum, directed posteriorly, not reaching pelvic fin origin. Pelvic fin small, origin ventrally, directed posteriorly, not or just reaching anal fin origin. Total number of vertebrates 29–30, of which 13–14 have pleural ribs and 15–16 have haemal spines.

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Fig. 5. **A)** Male of *Scriptaphyosemion bertholdi*, SL 93/51, Sierra Leone, Victoria, not preserved. **B)** Female of *Scriptaphyosemion bertholdi*, SL 93/51, Sierra Leone, Victoria, not preserved.

Live coloration. Males. (Fig. 4A) Lateral head blue with a slightly irregular red pattern typical for the endemic West African genera *Archiaphyosemion*, *Callopanchax*, *Nimbapanchax*, and *Scriptaphyosemion* and the related *Epiplatys* (Van der Zee 2002). Lips dark grey, red line around mouth along upper and lower lip, small dark grey dot at chin, iris of eye grey, dorso-anterior with blueish or blue-greenish hue, a light, reflecting ring around pupil. Dorsal from head to dorsal fin brownish, scales with some blue in centre and irregular red margins, forming an interrupted reticulated pattern. Flanks, unpaired fins and pelvic fins blue, dorsal and caudal fin centre often with a yellow hue, giving a more greenish impression of fin color. Red pigmentation on side in three to four very irregular stripes, consisting

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of red blotches, especially on caudal peduncle looking more like an interrupted reticulation. Unpaired and pelvic fins with a narrow blue margin, sometimes slightly lighter than color of fin centre and body; the blue margin is followed by a broad red submargin. On base of dorsal, anal, pelvic, and centre of caudal fin a small number of red blotches, pectoral fin transparent with a blue margin and a, more or less complete, red submargin.

Females. (Fig. 4B) Body brownish, dorsally darker, on ventral half of side and belly orange. Pigmentation on head similar to males, but mostly darker brown instead of red. Midlateral dark brown stripe, interrupted and slightly irregular on caudal peduncle, scales in this dark stripe sometimes with small red scale margins; centre of unpaired and pelvic fins brown-orange, with a very narrow blueish margin, and a faint, narrow red submarginal, except on caudal fin. Above submarginal on anal and pelvic fins a small area with blueish or greenish hue, centre of dorsal fin with small red dots, basally larger than marginally. Pectoral fin transparent.

Color in ethanol. Males. Body brownish, darker on back and lighter on belly, red pigmentation pattern of live specimens is now carmine or dark brown, on ventral side of head a small grey blotch on chin. Fin color light brown, unpaired fins with a whitish margin and a carmine or dark brown sub-margin, some carmine or brown dots, pelvic fins with a dark brown margin.

Females. Similar to males body brown with a darker dorsal and lighter ventral part, on side the same dark brown pigmentation as in live specimens, on ventral side of head a grey blotch as in males. Fins light brown, on dorsal several small brown dots.

Distribution and habitat. *Scriptaphyosemion wieseae* is currently known from three localities in the upland of northern Sierra Leone between the Sula and Wara Wara mountains (Fig. 1); all of these are located within the Seli or Rokel River basin. At the collection localities Fadugu (SL 03/15) and Lenghe Curoh (SL 03/16), *S. wieseae* is present in small rivers, at the former place together with *Epiplatys* cf. *njalaensis*, *Archiaphyosemion guineense*, undetermined characids, gobies, and cyprinids, probably *Barbus leonensis*, *B. stigmatopygus* and a small undetermined *Barbus* specimen; at the latter place it was collected together with *A. guineense*. At Kabala (SL 03/17), only a small number of mostly juvenile specimens were collected in large rice swamps. The second author visited this area two times, in 1993 and 2003, and noticed an intensified agricultural land usage.

Collections of the second author during four collection trips between 1989 and 2003 suggest that there is no overlap of the distribution areas of *S. bertholdi* and *S. wieseae* (Fig. 1). *Scriptaphyosemion bertholdi* inhabits southeastern Sierra Leone and is found in river basins which enter the Atlantic ocean through the southern costal area (Huber 2007; Wildekamp 1993; Wildekamp & Van der Zee 2003), whereas *S. wieseae* inhabits the upper tributaries of the Seli or Rokel River, which enter the Atlantic ocean more to the north (Fig. 1). The geographically closest *Scriptaphyosemion* species with regard to the known collection localities of *S. wieseae* is *S. chaytori* (Fig. 1), to the north in Guinea it is *S. guignardi* (Busch 1995a; Wildekamp & Van der Zee 2003; own unpublished collection data)

Etymology. The new species is named after Barbara Wiese, who accompanied the second author on most of his research trips in West Africa and was the first who recognized it as a new *Scriptaphyosemion* species.

DISCUSSION

Scriptaphyosemion wieseae is distinguished from the closely related *S. bertholdi* (Figs 2–3) by several diagnostic characters, and is probably separated by strong genetic incompatibilities (Vandersmissen 2003). As proposed by Roloff (1971a), female color characters can be useful for distinguishing between some *Scriptaphyosemion* species, here by the diagnostic lateral color pattern differences between *S. wieseae* (Fig. 4B) and *S. bertholdi* (Fig. 5B). However, female pigmentation pattern can be obscured by several factors, as e.g. stress, and vary in intensity (Roloff 1971a; own observations).

The combination of high variability in male coloration between isolated populations of one species and the often only small diagnostic color pattern differences between species can make species identification in *Scriptaphyosemion* difficult (Roloff 1971a; Scheel 1990).

The recent introduction of molecular methods in taxonomic and phylogenetic studies of nothobranchiid killifishes added an additional and independent set of characters and helped to resolve complicated cases of species level taxonomy (e.g. Legros & Zentz 2007b; Legros et al. 2005; Sonnenberg 2007, 2008). This approach can also be applied to resolve the taxonomy of *Scriptaphyosemion* by clarifying the relationships between species and pinpointing diagnostic characters in terms of morphology and color pattern.

Our present results are largely congruent with those of Murphy et al. (1999), if only the well supported nodes are considered. Differences e.g. in the placement of *S. roloffi* are based on different opinions on the species level taxonomy. Incongruences in the placement of some species and low support of several nodes might be based on insufficient information content in the dataset.

The perceived variability of male coloration in the absence of other diagnostic characters and different species concepts led to varied opinions concerning species valid-

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ity and number between authors (e.g. Costa 2008; Huber 2007; Lazara 2001; Scheel 1968, 1990; Wildekamp 1993). Even decades after Roloff (1971a) and Scheel's (1990) comments on the taxonomic difficulties, the species level taxonomy of *Scriptaphyosemion* is still far from being resolved. Here we provide an overview of species names in *Scriptaphyosemion* and their synonyms, with short comments on species whose taxonomy needs a revision. We mainly follow the species level taxonomy as proposed by Costa (2008); the species concept employed is that of Moritz et al. (2000).

The following species, *S. bertholdi*, *S. brueningi*, *S. chaytori*, *S. fredrodi*, and *S. schmitti* have comparatively smaller distribution areas, and usually show less variability in the diagnostic characters than the species listed below. They are, with the exception of *S. fredrodi*, concordantly considered as valid species by most authors (Costa 2008; Huber 2007; Lazara 2001; Wildekamp & Van der Zee 2003). In addition, the studied samples of these species show considerable genetic distance with regard to their closest relatives within the molecular phylogenies (Figs 2–3, Murphy et al. 1999), supporting their status as separate species.

Scriptaphyosemion geryi is distributed from northern Sierra Leone to the Senegal (Wildekamp 1993; Wildekamp & Van der Zee 2003). Within this large area, differences in coloration pattern between populations are known (e.g. Cauvet 2008; Etzel & Berkenkamp 1979; Wildekamp 1993), indicating that probably more than one species is currently included under this name.

Scriptaphyosemion guignardi was the first of three formally described species of a species complex (Romand 1981, 1982; Seegers 1982). According to the DNA study of Murphy et al. (1999), these three species form a monophyletic group. Costa (2008) listed them as valid species, but Etzel & Berkenkamp (1989a, b) and Etzel & Vandersmissen (1984), based on crossing experiments, regard *S. nigrifluvi* and *S. banforense* as junior synonyms of *S. guignardi*. A short comparison of the published cytochrome b sequences of Murphy et al. (1999) indicate considerable genetic divergence between the three studied specimens (4.9–10.8 %) which is in the range of intraspecific divergence values in killifishes (Murphy et al. 1999; Sonnenberg 2007, 2008; Sonnenberg & Blum 2005; Van der Zee & Sonnenberg 2011; own unpublished data). In addition, these species share some coloration characters, which indicates their close phylogenetic relationship. Still they are diagnosable by male coloration characters. Studies employing crossing experiments (e.g. Etzel & Berkenkamp 1980a, b, c, 1989a, b; Etzel & Vandersmissen 1984; Romand 1986; Scheel 1968, 1990) show, that between many populations different levels of genetic incompatibility exist. However, the conclusion that successful crossings up to the third generation indicate that they are conspecific is viewed with strong hesitation. The difficulties of the biospecies concept of Mayr (1963) is discussed in literature (e.g. Otte & Endler 1989), and recent examples of hybrid species and mitochondrial introgressions between species prove the possibility of fertile hybrids between distinct species (e.g. Nolte et al. 2005; Schliewen & Klee 2004; Schwarzer et al. 2011; Sonnenberg 2007). At the moment we follow Costa (2008) in regarding them as three separate species.

The description of *Scriptaphyosemion liberiense* is based on preserved females (Boulenger 1908). It has a large distribution in coastal Liberia (Wildekamp & Van der Zee 2003). *Aphyosemion calabaricus* Ahl, 1936, described on specimens from an ornamental fish import without secure collection locality, and *Epiplatys melantereon* Fowler, 1950 were considered as junior synonyms to *S. liberiense* (Costa 2008; Eschmeyer 2011; Huber 2007). However, *S. liberiense* in its current usage is rather variable in male phenotype between different populations (Etzel 1992, 1993; Milkuhn 2007, 2008; Wildekamp 1993). Roloff (1971b) proposed that *S. calabaricum* females differ in coloration pattern from *S. liberiense* as described by Boulenger (1908) and might represent a different species. A careful study of *S. liberiense* over its distribution range will be necessary to search for potentially separating stable diagnostic characters between groups of populations and to decide about the status of *S. calabaricum*. At the moment we tentatively consider this species as a synonym of *S. liberiense*.

Scriptaphyosemion roloffi was accidentally described by Roloff (1936), the intended description by Ahl (1937) followed a year later. Both authors gave a detailed color pattern description of the new species, drawings or black and white pictures, the latter ones from E. Roloff or W. Harvey, were published by different authors (e.g. Henzelmann 1937; Mayer 1937; Ott 1997). By later authors (e.g. Etzel 1978c; Scheel 1968, 1990; Wildekamp 1993) the identity of *S. roloffi* was confused due to the inclusion of different populations, which do not show the diagnostic characters of the specimens described by Roloff (1936) and Ahl (1937) and probably represent different species. Etzel & Berkenkamp (1980a, b, c) presented the results of crossing experiments between different populations, which were assumed to be *S. roloffi*, but most probably included at least one currently undescribed species, judged from the published drawings. In 1979, *S. etzeli* was described by Berkenkamp, based on specimens which show the same coloration characters as given in the description of *S. roloffi* (Ahl 1937; Henzelmann 1937; Mayer 1937; Roloff 1936). The synonymy of *S. etzeli* with *S. roloffi* in the sense of Roloff (1936) and Ahl (1937) was discussed by Busch (1995b, 1996) and Ott (1997). We are of the opinion that *S. etzeli* is a junior synonym of *S. roloffi*, based on the diagnostic coloration characters of males and females, and that *S. roloffi* in the current usage (Berkenkamp 1979; Etzel & Berkenkamp 1980a, b, c; Et-

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zel 1978a, c; Etzel et al. 2004; Huber 2007; Wildekamp 1993) probably contains at least one undescribed species.

The incongruence of the placement of *S. roloffi* between our study (Figs 2–3) and Murphy et al. (1999) is caused by different taxonomic concepts. Their *S. etzeli* is in our view *S. roloffi* and the *S. roloffi* sample in their study most probably is an undescribed species. The voucher of *Scriptaphyosemion* sp. in our DNA analyses (Figs 2–3) belongs to the group of populations currently considered by other authors as conspecific with *S. roloffi*. However, it does not show the diagnostic coloration characters of this species and belongs to a different genetic lineage, closer to *S. fredrodi*, and might probably be an undescribed species related to that labeled as *S. roloffi* in Murphy et al. (1999). *Scriptaphyosemion hastingsi* (Wright, 1972), also was an accidental description, but should be restudied by new collections with regard to the species complex currently included in *S. roloffi*, to which it is currently considered as a synonym (e.g. Eschmeier 2011; Huber 2007; Wildekamp 1993). We tentatively consider it as a synonym, but it might turn out to be a valid name for a species currently included in *S. roloffi*.

For the two species names, *Roloffia caldal* Cahalan, 1973 and *Aphyosemion muelleri* Scheel, 1968, we follow other authors (Eschmeyer 2011; Huber 2007; Wildekamp 1993), who consider them as invalid or not available, as they were not mentioned by Costa (2008).

COMPARATIVE MATERIAL

Scriptaphyosemion bertholdi (Roloff, 1965): ZFMK 47708–47714, Sierra Leone, Victoria, collection locality SL 93/51.
Scriptaphyosemion brueningi (Roloff, 1971b): ZFMK 47715–47725, Sierra Leone, Perie, collection locality SL 89 Perie; ZFMK 47726–47735, Sierra Leone, Tawai, collection locality SL 03/2.
Scriptaphyosemion calabaricum (Ahl, 1936): ZMB 21039, Lectotype, Nigeria (probably from Liberia); ZMB 31494, Paralectotype, collected with the Lectotype.
Scriptaphyosemion cauveti (Romand & Ozouf-Costaz, 1995): ZFMK 47736–47739, Guinea, Kamara Bounyi, collection locality GM 97/5.
Scriptaphyosemion chaytori (Roloff, 1971a): ZFMK 47740–47755, Sierra Leone, Kamabai, collection locality SL 93/34; ZFMK 47756–47760, Sierra Leone, Nom-Mussiray, collection locality SL 93/38.
Scriptaphyosemion fredrodi (Vandersmissen, Etzel & Berkenkamp, 1980): ZFMK 47761–47775, Sierra Leone, Matanga, collection locality SL 89 Matanga.
Scriptaphyosemion geryi (Lambert, 1958): ZFMK 47776–47780, Sierra Leone, Rotain, collection locality SL 89 Rotain.
Scriptaphyosemion guignardi (Romand,1981): ZFMK 47781–47782, Guinea, Gubi, collection locality GM 97/13.
Scriptaphyosemion liberiense (Boulenger, 1908): BMNH 1903.6.3.17–18, syntypes, Liberia, Monrovia; ZFMK 47783–47785, Liberia, Paynesville, collection locality L97; ZFMK 12163, Liberia, surrounding of Monrovia, commercial import; ZFMK 12659-662, Liberia, Totota.
Scriptaphyosemion melantereon (Fowler, 1950): ANSP 72125, Holotype, Liberia, Robertsport; ANSP 72126–27, Paratypes, collected with holotype.
Scriptaphyosemion roloffi (Roloff, 1936): ZMB 21071, Lectotype, Sierra Leone, tribuary of Port Loko Creek, ca. 40 km east-northeast of Freetown, ZMB 31472, Paralectotypes, collected with Lectotype; ZFMK 47786–47798, Sierra Leone, Malai, collection locality SL 03/11; ZFMK 47799–47813, Sierra Leone, Lungi Lol, collection locality SL 99/10; ZFMK 12678-80 (as *S. etzeli*), Sierra Leone, Port Loko district, Kirma.
Scriptaphyosemion schmitti (Romand, 1979): ZFMK 47814–47815, Liberia, Juarzon, aquarium bred specimens.
Scriptaphyosemion sp. aff. *roloffi*: ZFMK 47816–47819, Sierra Leone, Devil Hole, collection locality SL 03/18; ZFMK 47820–47825, Sierra Leone, Kundubu, collection locality SL 93/6; ZFMK 12656-58, Sierra Leone, Magbenta; ZFMK 14808-11, Sierra Leone, 15 km north Bo.

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Mercediella nom. nov., a replacement name for *Camposichthys* Figueiredo & Silva Santos, 1991 (Pisces: Pycnodontiformes)

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Abstract. *Camposichthys* has been published three times for genera of bony fishes, generating a triple homonymy which is described and analyzed in this paper. A replacement name for the youngest homonym is presented.

Camposichthys Travassos, 1946 (Characiformes: Cynodontidae)

Travassos (1946) was the first to errect *Camposichthys* and did so on some erroneous assumptions regarding the then complicated status of *Cynodon* Spix in Spix & Agassiz, 1829, *Raphiodon* Agassiz in Spix & Agassiz,1829, and *Rhaphiodonichthys* Campos, 1945 (see Kottelat 1988). In Opinion 2012, the International Commission on Zoological Nomenclature (2002) considered *Camposichthys* Travassos, 1946, to be a junior objective synonym of *Cynodon* Spix in Spix & Agassiz, 1829, and placed it in the 'Official Index of Rejected and Invalid Generic Names in Zoology'. Despite this nomenclatural act, in accordance with § 80.7.1 of the current version of the Code (ICZN 1999) this name continues to compete in homonymy.

Camposichthys Whitley, 1953 (Characiformes: Curimatidae)

In 1953, Whitley established *Camposichthys* as a replacement name for *Camposella* Fernandez-Yepez, 1948 preoccupied by *Camposella* Cole, 1919 (Insecta: Diptera) and, when he learned that *Camposichthys* Whitley, 1953 was also preoccupied, in 1954 he replaced it with a new name, *Stupens*.

Camposichthys Figueiredo & Silva Santos, 1991 (Pycnodontiformes: Pycnodontidae)

Camposichthys was used a third time as the name of a new genus of Pisces by Figueiredo & Silva Santos (1991), for †*Camposichthys riachuelensis*, a fossil pycnodontid species from Brazil described as new in the same paper. This genus is currently treated as valid (Barbosa et al. 2008; Figueiredo 2009; Poyota-Ariza & Wenz 2002; Souza Lima et al. 2002) and no junior synonym is available for this genus that could serve as a replacement name.

To resolve the remaining homonymy between *Camposichthys* Travassos, 1946, and *Camposichthys* Figueiredo & Silva Santos, 1991, *Mercediella* is here proposed as a replacement name for the latter junior homonym following §§ 53.2, 56.1 and 60.3 of the Code. The only known member of this genus is the originally designated type species †*Mercediella riachuelensis* (Figueiredo & Silva Santos, 1991).

The new name honours Mercedes Azpelicueta, ichthyologist and paleoichthyologist from La Plata, Argentina. Thanks are due to Miguel Alonso-Zarazaga, Madrid, and Alain Dubois, Paris, for sharing their experience and expertise regarding the rules of the Code. An earlier version of this paper benefited from comments of Mark Wilson, Edmonton, and an anonymous reviewer.

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Report on the life colouration of the enigmatic burrowing skink *Voeltzkowia rubrocaudata* (Grandidier, 1869) from southwestern Madagascar

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Abstract. *Voeltzkowia* is a monophyletic genus of burrowing skinks endemic to Madagascar. The fossorial habits of these species make them hard to see and study, and witness their life history traits. During two herpetological surveys in southwestern Madagascar (in 2009 and 2011) we found several *Voeltzkowia rubrocaudata* individuals in a corn plantation, a habitat that differs from the forested habitat reported in the literature. Life colouration for this shy scincid is described for the first time.

Key words. Southwestern Madagascar, corn plantation, Squamata, Scincidae.

Voeltzkowia Boettger, 1893 is a poorly known monophyletic genus of scincid lizards endemic of Madagascar (Whiting et al. 2004, Schmitz et al. 2005, Crottini et al. 2009). Species of this genus belong to a phylogenetic clade that contains species of *Amphiglossus* sensu strictu, and the other limb-reduced *Pygomeles* and *Androngo*. With a body elongation and limb reduction, these shy and enigmatic skinks show burrowing habits (Brygoo 1981, Glaw & Vences 2007). The genus is currently composed of three completely limbless species (*V. lineata, V. mira* and *V. rubrocaudata)*, and two species with very rudimentary hindlimbs (*V. petiti* and *V. fierinensis*), but a careful genus revision is currently in act and may increase the number of species of this enigmatic group (A. Miralles, pers. comm.). Despite exhaustive field surveys, fossorial skinks are usually hard to find and some species were not being observed on the island for more than a century (Brygoo 1981, Köhler et al. 2010).

According to the original description, a reddish tail characterizes *Voeltzkowia rubrocaudata*. This species is known from many locations in the arid regions of southwestern and western Madagascar (Grandidier 1869, Glaw & Vences 2007). In this manuscript we report for the first time on the life colouration of live individuals of the species *Voeltzkowia rubrocaudata,* providing also an update on its known distribution and details on habitat preferences.

The individuals reported were found during two herpetological surveys carried out in southwestern Madagascar in late 2009 and early 2011. According to available data summarised by Glaw & Vences (2007), *V. rubrocaudata* is known from Ambohimahalevona, Ampoza, Befandriana, Beroboka Avaratra, Fierin, Isalo, Toliana and Zombitse Forest (currently integrated in the complex Zombitse-Vohibasia National Park). Despite recent herpetological surveys in Zombitse, our team could not confirm its presence. Additionally, intensive research at Isalo National Park (e.g., Mercurio et al. 2008) provided similar results in that area: nevertheless, we observed traces on sand along dry rivers that probably refer to a burrowing skink species.

When pictures of other *Voeltzkowia* species were shown to local people in Andranomaitso (a small village on the Route Nationale 7, Commune rurale de Sakaraha), they informed us that similar animals would be found in the corn plantation near the village (S22° 53' 52.2"– E44° 39' 23.1", 710 m a.s.l.; fig. 1). An intensive search, performed by digging the earthy dry substrate close to the stems and roots, and flipping the rocks of the area, led us to find one individual [MRSN R3726; (corresponding to the tissue sample ACZC2565 where ACZC refers to field numbers of A. Crottini); GenBank accession number JQ005113] on the 11 December 2009 (fig. 2). Such individual (probably a male, SVL 52 mm, with 115 ventral

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Fig. 1. Habitat of *Voeltzkowia rubrocaudata*: corn plantation (in foreground) near the village of Andranomaitso, Commune rurale de Sakaraha.

Table 1. Morphological measurements (all in mm) of specimens of *Voeltzkowia rubrocaudata* from southwestern Madagascar. Used abbreviations are: MRSN (Museo Regionale di Scienze Naturali, Torino), FAZC (Franco Andreone Zoological Collection, Field numbers), SVL (snout–vent length), TL (total lenght), VS (ventral scales), DS (dorsal scales), MBS (midbody scales).

MRSN	FAZC	SVL	TL	VS	DS	MBS
R3726	14370	52	82.5 *	115	113	18
R3738	14776	90	127.5	120	119	19
R3742	14777	63.5	100	116	120	19
R3743	14778	58	90.5	116	118	19
R3744	14775	78	127	117	119	19

* tip of the tail removed as DNA tissue sample.

scales, 113 dorsals, 18 around midbody) was burrowed <10 cm deep near a corn root. Nine other individuals were found during a second visit that took place in the same area on the 14 February 2011. Of these, four are now hosted in the zoological collection of the Museo Regionale di Scienze Naturali (Turin, Italy) (MRSN R3738, R3742–3744), and five are hosted in the zoological collection of the Parc Botanique et Zoologique de Tzimbazaza (Antananarivo, Madagascar) (Franco Andreone field numbers FAZC 14779–14783). Morphological measurements are presented in Table 1 and overall fit the descriptions provided by Mocquard (1894) and Brygoo (1981).

All these individuals are attributed to *V. rubrocaudata* due to the absence of hindlimbs, high number of ventral scales, and nostril in contact with first suprabial, according to the indications by Brygoo (1981). Notwithstanding, one major diagnostic character, the red tail (from which the specific epithet) was missing from all the examined live individuals. Chromatic differences among the individuals do not seem to be accentuated. The overall live colouration was light beige with pinkish and yellowish nuances on the back, and dark arrays of small dark points that form longitudinal stripes on the caudal portion. In particular, two individuals currently hosted in MRSN, and featured by a rather small body size (MRSN R3742–3743) have the dark lines on the tail quite evident and contrasted. The ventral side of the individuals was a slightly lighter. The five specimens housed in MRSN after about three years (MRSN R3726) and one year (MRSN R3738, R3742–3744) of preservation in ethanol (70%) show a general fade from beige into an almost whitish coloration, with persistence of the dark point and lines. In such a context it appeared quite unusual the absence of the red colouration reported by Grandidier (1869) and stressed by Brygoo (1981).

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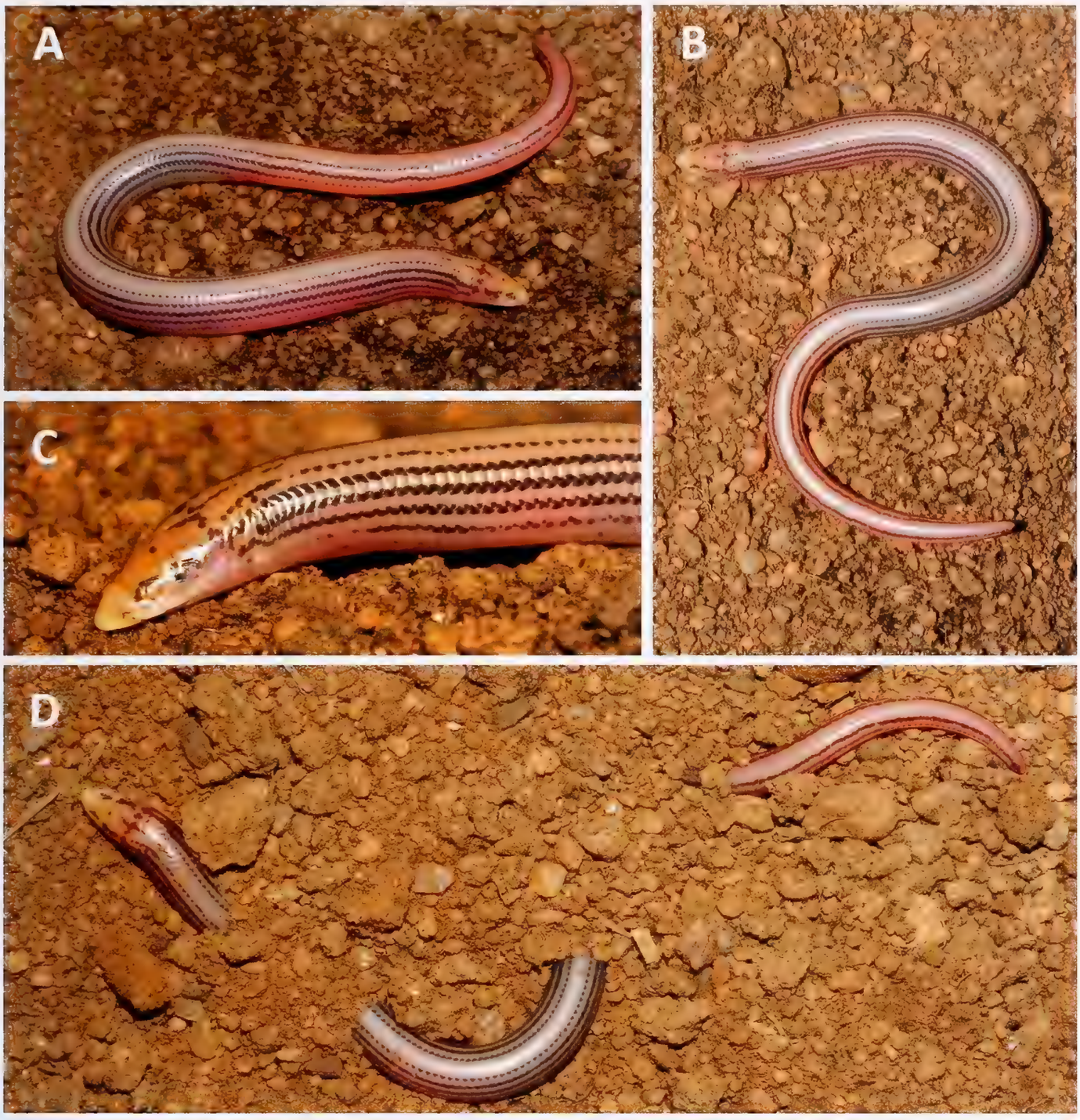

Fig. 2. *Voeltzkowia rubrocaudata* individual (MRSN R3726) in life from Andranomaitso village, southwestern Madagascar, found on the 11 December 2009: **A.** dorso-lateral overview; **B.** dorsal view; **C.** head close up; **D.** individual burrowing in the substrate. Photos by Gonçalo M. Rosa.

Further studies are necessary to understand the population variability of the species, and verify the persistence of the red colouration in the tails of specimens coming from the type locality (Fierin). Moreover, the habitats and ecology of this species are still poorly known, but this burrowing skink seems to be tolerant to anthropogenically-modified areas, benefiting from shaded habitat created by the platation, as well as soil tillage that makes digging easier.

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New data on the morphology and natural history of *Tetradactylus ellenbergeri* (Angel, 1922) (Sauria: Gerrhosauridae) and *Trachylepis ivensii* (Bocage, 1879) (Sauria: Scincidae) in northeastern Zambia

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Abstract. We report new observations regarding the morphology, behaviour and habitat of the two sparsely known lizards *Tetradactylus ellenbergeri* (Gerrhosauridae) and *Trachylepis ivensii* (Scincidae) from northeastern Zambia and review the available data about the distribution of both species.

Key words. Sauria, *Trachylepis ivensii*, *Tetradactylus ellenbergeri*, habitat, Africa, Ikelenge, Zambia.

In 2008, a field study was conducted in the Ikelenge area (northern Mwinilunga District) of Zambia to explore the unique diversity of amphibians and reptiles in this national biodiversity hotspot. Ikelenge is situated in the extreme north-western edge of Zambia within a pedicle wedged between Angola and the Democratic Republic of the Congo (DR Congo). Three other studies on the herpetofauna were conducted in this area in the past. Donald Broadley (1991) was the first who summarized a checklist of reptiles and amphibians of the northern Mwinilunga district. He recorded 57 reptiles and 35 amphibian species, including *Tetradactylus ellenbergeri* Angel, 1922 for the first time in the area. Later, in 1994, Alan Channing, Robert Drewes and Jens Vindum also did a field survey which was mainly concentrated on amphibians. The results of this study were never published but aspects are mentioned in a book on southern African amphibians (Channing 2001). Also Haagner et al. (2000) collected a series of both amphibians and reptiles from this area, including some records of *T. ellenbergeri*, and the discovery of *Trachylepis ivensii* Bocage, 1879 for the first time for Zambia and the DR Congo.

The herein described field survey was conducted between July and September 2008 to collect amphibians and reptiles. In this area the rainy season is nearly over in March and therefore this study was done, like the Haagner study (W.B. Branch, pers. comm.), in the colder dry season just after the rainy but before the hot dry season. During the study time seven specimens of *Tetradactylus ellenbergeri* and six specimens of *Trachylepis ivensii* were collected (see below). The vouchers are stored and catalogued in the herpetological collections of the Zoologisches Forschungsmuseum Alexander Koenig (ZFMK) in Bonn, Germany and the Muséum d'histoire naturelle (MHNG), Geneva, Switzerland.

Notes on *Tetradactylus ellenbergeri* (Angel, 1922)

Tetradactylus ellenbergeri is a snake-like plated lizard from southern central and eastern Africa and the sole member of the genus in Zambia. The genus is characterized by extremely reduced limbs. In *T. ellenbergeri* the front limbs are lacking and the hind limbs are reduced to about 2 mm. The tail is long, more than three times longer than the body. Individuals are slightly bluish above, with two median vertebral rows of brown scales. The temporal region is spotted brownish; the underside is pale olive (see fig. 1a).

Vouchers. ZFMK 88526–529, ZFMK 89188, ZFMK 89421, ZFMK 92525. Most of the voucher specimens were found within the Nchila Reserve, Hillwood Farm, near Ikelenge. One specimen (ZFMK 88529) was found by local collectors in the surrounding area. Five of the seven preserved specimens are adults and have a snout-vent length (SVL) between 59.7 and 68.5 mm, with an average of 64.0 mm (n= 5). The single subadult (ZFMK 88529) measures 41.4 in SVL. The sole juvenile (ZFMK 92525) measures 30.6 mm and has an original tail with a length (TL) of 93.8 mm. In adults, the TL measured in average 186.2 mm (114.2–250.0 mm; n=5) but in four specimens the tip is cut or the tail is regenerated. The only specimen (ZFMK 88528) with an original tail measured

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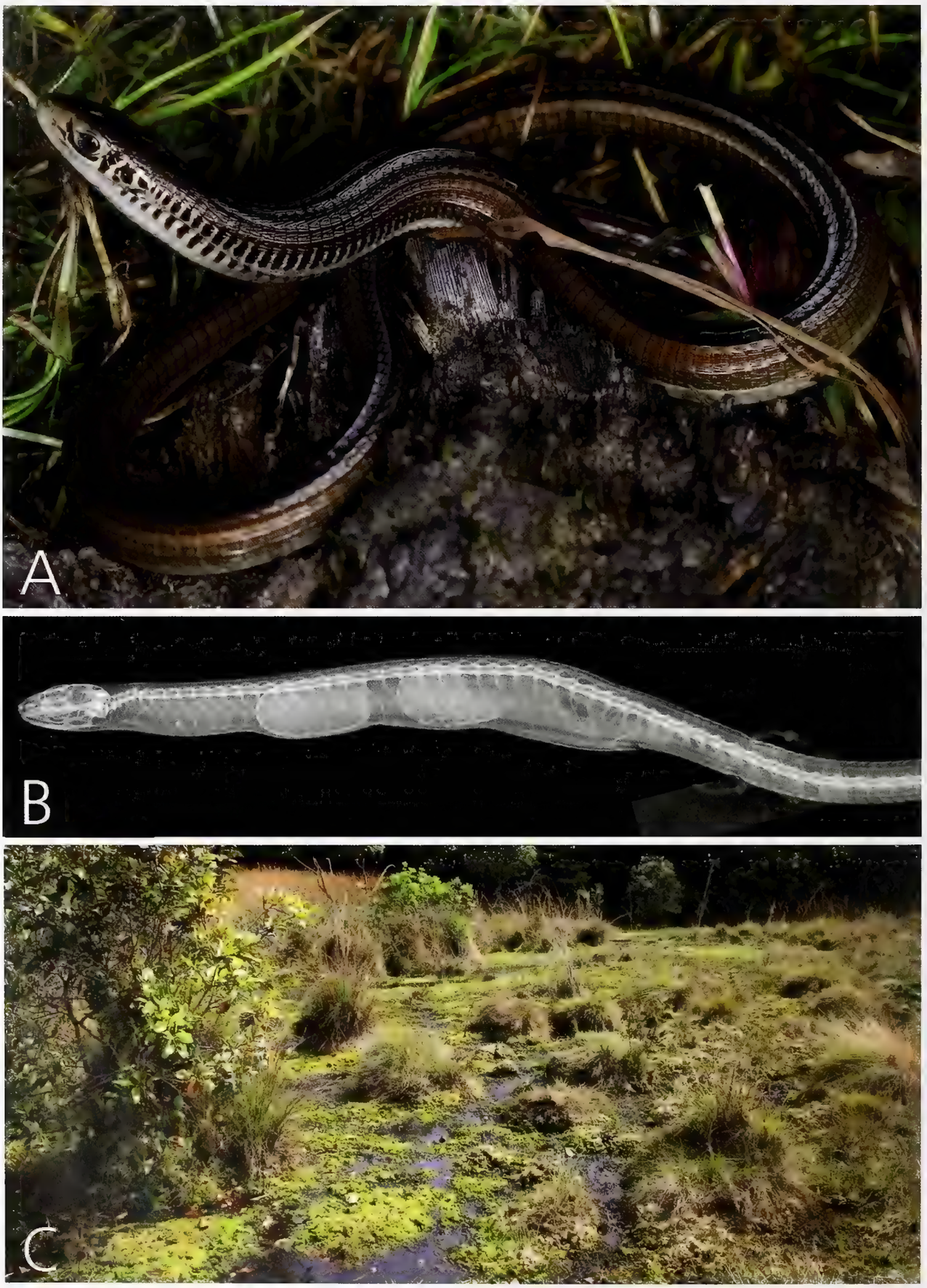

Fig. 1. *Tetradactylus ellenbergeri*. **A**= Specimen from Nchila Reserve, Hillwood Farm, Ikelenge, Zambia. **B**= X-ray image of a pregnant female containing two eggs of *T. ellenbergeri*. **C**= Habitat of *T. ellenbergeri* in the Nchila Reserve.

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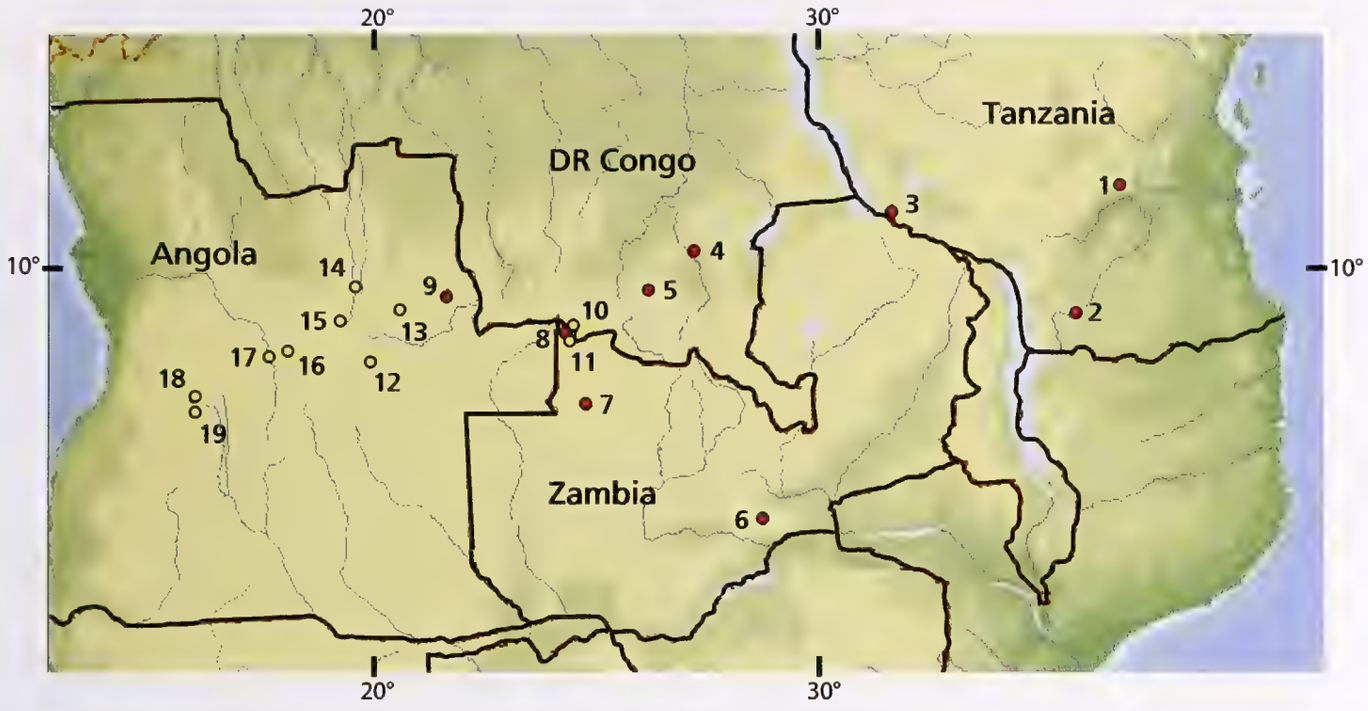

Fig. 2. Distribution of *Tetradactylus ellenbergeri* and *Trachylepis ivensii*. ***T. ellenbergeri.*** **1**= Tanzania: Gendawaki Valley, Udzungwa Mountains (Menegon et al. 2006). **2**= Tanzania: Tatanda (Spawls et al. 2002). **3**= Tanzania: Songea (Spawls et al. 2002). **4**= DR Congo: Kundelungu (Broadley 1971). **5**= DR Congo: Kansenia (Broadley 1971). **6**= Zambia: Chongwe River (Broadley 1971). **7**= Zambia: Lunga Game Reserve (Broadley 1971). **8**= Zambia: Ikelenge area. **9**= Angola: Lunda (Broadley 1971). ***T. ivensii.*** **10**= DR Congo: Sanolumba Village (Branch & Haagner 1993). **11**= Zambia: Ikelenge area, including source of the Zambezi and north of Ikelenge hospital (Branch & Haagner 1993). **12**= Angola: Luena (Branch & Haagner 1993). **13**= Angola: Dala, Lunda (Branch & Haagner 1993). **14**= Angola: Alto Cuilo (Branch and Haagner 1993). **15**= Angola: Alto Chicapa (Branch & Haagner 1993). **16**= Angola: Luando River (Branch & Haagner 1993). **17**= Angola: Curanza River (Branch & Haagner 1993). **18**= Angola: Cuando River (Branch & Haagner 1993). **19**= Angola: Huambo (Branch & Haagner 1993).

SVL: 60.5 mm and TL: 231.0 mm. This results in a TL/SVL ratio of 3.81, and therefore the tail is about four times longer than the body. Broadley (1991) mentioned a subadult specimen (National Museums of Zimbabwe, NMZB 10663) with a SVL of 56 mm and a TL of 200 mm, a ratio of 3.57.

Distribution. In Tanzania, the species is only known from three localities: Tatanda and Songea are mentioned by Spawls et al. (2002), whereas Menegon et al. (2006) found the species also at Gendawaki Valley in the Udzungwa Mountains which is the easternmost record. In Zambia it is known from three localities (Chongwe River, Lunga Game Reserve, Ikelenge area), and even in DR Congo and Angola it is only known from few localities (see fig. 2).

Habitat. Spawls et al. (2002) noted that the Tanzanian specimens live in moist savanna. All specimens from the Nchila Reserve were found in a similar habitat (fig. 1c), a swampy grassland, interspersed with grass tussocks. A typical such habitat is about six metres broad and 300 metres in length, bordering the gallery forest of the Sakeji River. Specimens of *T. ellenbergeri* were captured during daytime, basking on the top of grass tussocks. If disturbed, they tried to escape, diving into the water between the tussocks. The muddy water is relatively deep, between 10 and 30 cm. *Sphagnum* moss (Bryophyta, Sphagnaceae) and sundew plants (Magnoliophyta, Droseraceae) were found between the tussocks in this habitat. Both plants indicate a permanent water body. In the more open areas of the water body, *Sphagnum* spec. is dense and overgrows the expanse of water.

Natural history. Spawls et al. (2002) mentioned the species as diurnal and probably oviparous. Haagner et al. (2000) recognized ova and eggs in several specimens collected in April, but one adult female (ZFMK 88526, field no. PW HF 296) collected much later in the year, on August 18th, 2008 also contained two well developed eggs (see fig. 1b).

If grasped, these lizards readily shed their tails. However, tail regeneration is rapid, probably because the tail is essential for locomotion. A captive specimen regenerated one centimetre of a freshly lost tail in four weeks.

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Fig. 3. *Trachylepis ivensii*. **A**= Specimen from Nchila Reserve, Hillwood Farm, Ikelenge, Zambia. **B**= Typical habitat of *T. ivensii* in the Nchila Reserve. **C**= Typical habitat of *T. ivensii* at the Zambezi north of Ikelenge.

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Notes on *Trachylepis ivensii* (Bocage, 1879)

Trachylepis ivensii is a relatively poorly known scincid lizard from south-western central Africa and has so far only been recorded from a handful of vouchers worldwide. Branch & Haagner (1993) reported 21 specimens collected by them and 17 are preserved at the Port Elizabeth Museum (PEM). Additionally, two specimens were donated to the Lambiris private collection and two to the Natural History Museum of Zimbabwe (NMZB). Nine specimens are present in the collection of the American Museum of National History (AMNH) and three at the California Academy of Science (CAS). Also Boulenger (1887) mentioned one specimen present in the collection of the British Museum (BMNH). Together with the six specimens collected in this study, only 40 vouchers exist in museums worldwide. The specimens mentioned by Bocage (1879) including the name bearing type are lost (Branch & Haagner 1993).

T. ivensii is a large, elongate species of the genus with a greatly enlarged tail (see fig. 3a). It is characterized by having two to three (usually three) ear lobules and 28–32 scales rows around midbody. Body scales are keeled and heavily keeled over the middle of the back.

Belly, throat, underside of tail and limbs are patternless; limbs are dark brown, with two fine darker lines on the upper sides of the forelimbs and a white band separating the upper and lower surfaces of the hindlimbs. Head and body are covered with a stripe pattern. On the back and the tail are three (one vertebral, two dorsolateral) pale brown stripes, arising at the temporal region. A white and dark framed stripe arises on both sides at the nasal region and runs beneath the eye and through the ear along the flanks and fades above the top of the hind limbs. A second such stripe arises beneath the ear and runs along the lateral part of the body, separating the belly from the flanks, passing the hind limbs and extending on the tail to the tip. The stripes are lacking on regenerated parts of the tail. Further characteristics of the species are described by Branch & Haagner (1993) and can be seen in figure 3a.

Vouchers. ZFMK 88547–551, MHNG 2713.34.

Distribution. This skink is only known from Angola, Zambia and south-western DR Congo. Branch & Haagner (1993) recorded it for the first time in Zambia, from the northern Mwinilunga District and the adjacent DR Congo, which are the only known localities from these countries to date. In Zambia the species was only found along to the Sakeji and Zambezi rivers at Ikelenge area; the DR Congo record is from Salolumba village, 46 km north east of Sakeji. In Angola, *T. ivensii* is known from several rivers in the centre of the country (see fig. 2).

Habitat. This species was always found near water bodies or muddy areas, within open grass- or woodland. Specimens were observed along the Sakeji and Zambezi River, only a few metres away from the riverbank (see fig. 3c). If there was gallery forest, individuals were never observed on the riverbank, but along the forest border in muddy grassland (see fig. 3b). However, the species is not just known from watercourses. Voucher specimens in the collection of the California Academy of Sciences (CAS 196639–641) came from fishponds on Hillwood Farm, near Ikelenge. Branch & Haagner (1993) found their vouchers basking on logs alongside the origin of the Zambezi River and near Ikelenge hospital at the Zambezi rapids. Additionally, they found individuals along the Sakeji River at Sakeji School, near Ikelenge.

Natural history. Previous authors recognized the partially aquatic habits of this species. Laurent (1964) noted that local people found the lizard in fish traps, whereas Manaças (1963) found the lizards in muddy areas alongside riverbanks. Haagner et al. (2000) gave a detailed description of the behaviour and mentioned specimens basking on vegetation on the banks of the Sakeji River. If disturbed the lizards leapt into the water, swam underwater with lateral undulations of body and tail and escaped into submerged vegetation. We also observed this behaviour. One specimen we tried to catch close to the riverbank jumped off a small cliff into 1.5 m deep water and escaped. Surprisingly, three individuals were found in holes that presumably were self-excavated by the skinks; one of these was dug out by a local man. These burrows were about 20 to 30 cm in length and in a distance from river bank of about one to two meters. However, despite the fact that *T. ivensii* only lives near water sources and also swims, dives and jumps into the water to escape capture, it is not an aquatic species, and probably similar to the African semi-aquatic species *Varanus niloticus* (Varanidae) and the members of the scincid genus *Cophoscincopus* from West Africa (Böhme et al. 2000).

Very recently, Blackburn & Flemming (2012) have shown that reproducing females ovulate tiny eggs and later supply the nutrients for development by placental means. Moreover, the recognized pattern of fetal membrane development in *T. ivensii* is unique among vertebrates and the species represents a new extreme in placental specializations of reptiles (Blackburn & Flemming 2012).

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New data about some Alticini from Taiwan with descriptions of two new species (Coleoptera: Chrysomelidae)

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Abstract. The distributional and taxonomical data on alticine genera *Taiwanoliprus* Komiya, 2006, *Pseudoliprus* Chûjô & Kimoto, 1960, *Lipromorpha* Chûjô & Kimoto, 1960, and *Psylliodes* Latreille, 1829 are presented. *Psylliodes palleola* Motschulsky, 1866 and *Psylliodes angusticollis* Baly, 1874 are synonymized with *Psylliodes viridana* Motschulsky, 1858 based on the examination of the type material. The homonymy of *Lipromorpha cyanea* L. Medvedev, 2009 from Laos and *Lipromorpha cyanea* Chen et Wang, 1980 from Yunnan is revealed. Three species *Psylliodes subrugosa* Jacoby, 1885, *Psylliodes chujoe* Madar, 1960, and *Psylliodes cantonensis* Gruev, 1981 are recorded from Taiwan for the first time. Two new species are described: *Lipromorpha alutacea* Nadein, sp. n. and *Psylliodes yuae* sp. n.

Key words. Alticini, flea beetles, *Lipromorpha*, *Pseudoliprus*, *Taiwanoliprus*, *Psylliodes*, synonyms, homonymy, new species.

INTRODUCTION

The alticine genera *Taiwanoliprus* Komiya, 2006, *Pseudoliprus* Chûjô & Kimoto, 1960, *Lipromorpha* Chûjô & Kimoto, 1960, and *Psylliodes* Latreille, 1829 are represented in Taiwan by 14 species (Kimoto & Takizawa 1997; Komiya 2006; Döberl 2010). These are: *Taiwanoliprus wenroni* Komiya, 2006, *T. endonis* Komiya, 2006, *Pseudoliprus lalashanensis* Komiya, 2006, *P. kimotonis* Komiya, 2006, *P. saigusai* Kimoto, 1970, *Lipromorpha montana* Chûjô, 1935, *L. shirozui* Kimoto, 1970, *L. difficilis* Chen, 1934, *Psylliodes taiwana* Takizawa, 1979, *P. taiwanica* Chûjô, 1935, *P. chlorophana* Erichson, 1842, *P. brettinghami* Baly, 1862, *P. angusticollis* Baly, 1874, and *P. punctifrons* Baly, 1874. The presence of *L. difficilis* in the Taiwanese fauna requires confirmation (Medvedev 2009). The range of this species is wider in comparison with others species of the genus. It is recorded from Vietnam, South China, Ryu-Kyu Isl., and Taiwan. In general, the species of *Lipromorpha* have tendencies to local endemism; mostly this concerns insular species. Except *L. difficilis*, no continental species is known from islands of the Oriental Region. Supposedly, the records of this species for Japan and Taiwan are based on misidentifications.

The knowledge on the distribution of the above-mentioned species is fragmentary; some of them are known from the type locality only or from one or two regions of Taiwan. New distributional data presented here supplementing the known records of the species. The data about probable host plants for some species are also given. Two new species of the genera *Lipromorpha* and *Psylliodes* are described.

MATERIAL

The material depositories are abbreviated as following:

HNHM	Museum of Natural History, Budapest
ZMHB	Museum für Naturkunde, Humboldt Uni., Berlin
BMNH	Natural History Museum, London
TARI	Taiwan Agricultural Research Insitute, Taichung
ZMUM	Zoological Museum, Moscow State University
NC	K. Nadein collection, Kiev

RESULTS

Psylliodes brettinghami Baly, 1862

Material examined. **Taipei City**. Taiwan: Taipei, Yangmingshan, 24.III.2008, leg. H. Lee, 2 ex. (TARI); Taiwan: Taipei, Peihsinchuang, 20.I.2007, leg. S.-F. Yu, 1 ex. (TARI). **Yilan County**. Taiwan: Ilan, Chiuchihtse, 07.XII.2008, leg. M.-H. Tsau, 4 exx. (TARI). **Taoyuan County**. Taiwan: Taoyuan, Hsuanyuan, 16.III.2008, leg. M.-H. Tsao, 1 ex. (TARI). **Pingtung County**. Taiwan: Pingtung, Tahanshan, 22.II.2007, leg. S.-F. Yu, 1 ex. (TARI). **Taitung County**. Taiwan: Taitung, Imalintao, 04.II.2008, M.-H. Tsao, 3 exx. (TARI).

Remarks. Widely distributed in the Oriental region (Scherer 1969; Döberl 2010); from Taiwan it is recorded from Taito and Kwarenko (Kimoto & Takizawa 1997). The material examined was collected on *Solanum americanum* Miller and *Tubocapsicum anomalum* (Franch. & Sav.) Makino (Solanaceae).

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Figs 1–4. **1–3.** *Lipromorpha alutacea* sp. n. **1.** male, Hsitou; **2.** female, Tengchih; **3.** male, Tengchih. **4.** *Psylliodes palleola* Motschulsky, lectotype.

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Psylliodes cantonensis Gruev, 1981

Type material examined. *Psylliodes cantonensis*, paratypes: China: Canton W. E. Hoffman, 5 exx. (BMNH).

Additional material examined. **Taitung County**. Taiwan: Taitung, Hsiaolanyu, 25.VI.2009, leg. Y.-T. Chung, 7 exx. (TARI). **Tainan County**. Taiwan: Tainan, Yuching, 08.I.2009, leg. H.-T. Shih, 1 ex. (TARI).

Remarks. New to Taiwan. This species was described from China (Guandong Prov.). The material examined differs from the type specimens by the blue metallic colouration of dorsum, the completely yellowish-reddish legs including posterior femora, and the smaller punctures on the pronotal disk with flat interstices, whereas the structure of the aedaegus and hind tibia are identical.

Using the key in Kimoto & Takizawa (1997) these specimens key to *Psylliodes balyi* Jacoby, 1884. According to Scherer (1982) *P. balyi* is a synonym of *P. chlorophana* Erichson, 1842, a species which is omitted in the Catalogue of Palaearctic Coleoptera by Döberl (2010). As confirmed by the study of the type material of the latter taxon (*Psylliodes chlorophana*, holotype and 6 paratypes: Terra van Diem., Schayer, Nr. 56269. (ZMHB)) the two species differ in the structure of the aedeagus – evenly curved at lateral view in *P. cantonensis* and the apical half nearly straight and then slightly curved at lateral view in *P. chlorophana*. Possibly, at least in some cases this species is confused with *P. cantonensis* when reported from Taiwan and other regions.

Psylliodes chujoe Madar, 1960

Material examined. **Kaohsiung County**. Taiwan: Kaoshiung, Shihshan logging trail, 01–03.X.2008, leg. M.-H. Tsao, 2 exx. (TARI).

Remarks. New to Taiwan. The species was described from Japan (Kyushu). The specimens at our disposal differ somewhat from the type specimen (after original description) by the denser punctate vertex and pronotum, and smaller size – 4 mm. In the revision of Japanese *Psylliodes* (Takizawa 2005) the key thesis and diagnosis relating to *Psylliodes chujoe* differs clearly from the original description in many characters such as much smaller body size, shape and denser punctation of pronotum. This may suggest that the real *P. chujoe* remained unknown to the author. Meanwhile, in the key of Japanese *Psylliodes* by Kimoto & Takizawa (1994) the characters and figures of aedeagus correspond to the original description.

Psylliodes subrugosa Jacoby, 1885

Material examined. **Kaohsiung County**. Taiwan: Kaoshiang, Tengchih, 19.XI.2008, leg. C.-T. Yao, 1 ex. (TARI); the same locality, 05–13.XI.2008, leg. C.-T. Yao, 1 ex. (TARI); the same locality, 25.XI.–03.XII.2008, leg. C.-T. Yao, 1 ex. (TARI). **Nantou County**. Taiwan: Nantou, Tatachia, 17–24.III.2007, leg. C.-S. Tung, 1 ex. (TARI).

Remarks. New to Taiwan. The species is distributed in Japan, Russia (Far East: Sakhalin), and China (Döberl 2010).

Psylliodes viridana Motschulsky, 1858 (Fig. 5)
Psylliodes palleola Motschulsky, 1866, **syn. n.**
Psylliodes angusticollis Baly, 1874, **syn. n.**

Type material examined. *Psylliodes viridana*: Lectotype, male: Psylliodes viridana Motch. Ceylon / Lectotypus Psylliodes viridana Mts. L. Medvedev design. (ZMUM); Paralectotypes: Psylliodes viridana Motch. Mt. Nuva Ell. Ceyl. / Paralectotypus Psylliodes viridana Mts. L. Medvedev design., 5 exx. (ZMUM).
Psylliodes angusticollis: Holotype: Type H.T. / Baly coll. / Psylliodes angusticollis Baly Japan (BMNH).
Psylliodes palleola: Lectotype, male: Psylliodes palleola Motch. Ceylon / Lectotypus Psylliodes pallescens Mts. L. Medvedev design. (ZMUM)

Additional material examined. Taoyuan County. Taiwan: Taoyuan, Lalashan, 22.VII.2008, leg. H.-J. Chen, 1 ex. (TARI), the same locality, 02.IV.2009, leg. C.-F. Lee, 1 ex. (TARI); Taiwan: Taoyuan, Hsuanyuan, 12.VI.2008, leg. S.-F. Yu, 1 ex. (TARI), the same locality, 16.III.2008, leg. M.-H.Tsao, 1 ex. (TARI). **Taipei City**. Taiwan: Taipei, Sanchih, 20.III.2008, leg. H.-J. Chen, 1 ex. (TARI); Taiwan: Taipei, Shihlim, 13.III.2008, leg. H.-J. Chen, 1 ex. (TARI); Taiwan: Taipei, Wulai, 04.III.2008, leg. S.-F. Yu, 1 ex. (TARI). **Kaohsiung County**. Taiwan: Kaoshiang, Tengchih, 19.XI.2008, leg. C.-T. Yao, 1 ex. (TARI), the same locality, 17.XII.2008, leg. C.-T. Yao, 1 ex. (TARI), the same locality, 05.II.2009, leg. M.-H. Tsau, 1 ex. (TARI); Taiwan: Kaoshiang, Shihshan, logging trail, 01–03.X.2008, M.-H. Tsao, 17 exx. (TARI), the same locality, 06.II.2009, leg. S.-F. Yu & M.-H. Tsau, 5 exx. (TARI), the same locality, 24.III.2009, leg. M.-H. Tsou, 1 ex. (TARI), the same locality, 19–24.XI.2008, leg. C.-T. Yao, 1 ex. (TARI); Taiwan: Kaoshiang, Chuyunshan logging trail, 24.III.2009, leg. C.-F. Lee, 6 exx. (TARI). **Taichung District**. Taiwan: Taichung, Kukuan,

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Figs 5–7. 5. *Psylliodes viridana* Motschulsky: lectotype; **6–7.** *Psylliodes yuae* sp. n.: **6.** dorsal view; **7.** lateral view.

16.VII.2007, leg. M.-H. Tsau, 1 ex. (TARI). **Hsinchu County**. Taiwan: Hsinchu, Talulintao, 17.II.2008, leg. M.-H. Tsao, 12 exx. (TARI); Taiwan: Hsinchu, Feifengshan, 05.III.2009, leg. S.-F. Yu, 6 exx. (TARI); Taiwan: Hsinchu, Hsinfeng, 31.III.2009, leg. S.-F. Yu, 4 exx. (TARI); Taiwan: Hsinchu, Wufeng, 17.II.2009, leg. S.-F. Yu, 1 ex. (TARI); Taiwan: Hsinchu, Paoerhshuiku, 04.XII.2008, leg. S.-F. Yu, 1 ex. (TARI).

Remarks. Comparison of the type material reveals clearly that *Psylliodes angusticollis* is conspecific with *Psylliodes viridana* by the characteristic impunctate vertex, body outline, structure of hind tibia, and aedeagus.

Examination of the lectotype of *Psylliodes palleola* reveals its significant similarity to *P. viridana*. The only exception is colouration of the body, which is entirely yellow including legs in *P. palleola* (Fig. 4) in contrast to greenish dorsum and dark legs in *P. viridana* (Fig. 5). So far, no pale species of *Psyllodes* have been found in the Oriental Region. The reason of this colouration is very likely that the type specimen appears to be a teneral adult, which is not fully coloured. This is additionally confirmed by the incompletely developed and partly folded right elytron and the weakly sclerotized abdominal ventrites and aedeagus. Type material of both species was collected at the same locality "Nuwara Eliya" in Sri Lanka. The lectotype of *P. palleola* was designated by Medvedev (2006) and erroneously labeled "Lectotypus Psylliodes pallescens Mts. L. Medvedev design."; therefore, a new label with correct name is added to the specimen.

This species was previously reported for Taiwan from Kosempo (Kimoto & Takizawa 1997). Distributed also in S. India, Sri Lanka, Nepal, N. Vietnam, S. China, Korea, Japan, Russia (Far East: Primorskiy Terr., Sakhalin, South Kuriles) (Döberl 2010). The material from Taiwan was collected on *Solanum americanum* Miller, *S. lyratum* Thunberg, *S. peikuoensis* S. S. Ying (Solanaceae).

***Psylliodes yuae* sp. n.** (Figs 6, 7, 18–21)

Type material. Holotype, male: Taiwan: Taoyuan, Lalashan, 26.VI.2007, leg. S.-F. Yu (TARI); paratype: the same label data as holotype, 1 male, 1 female (TARI), 1 male (NC).

Description. Body (Figs 6, 7) elongate-oval, convex; dorsum shining black with metallic luster, ventral side black, antennae dark brown with three basal segments lighter, yellowish-brownish, tibiae and femora dark brown to nearly black, knees and tarsi light brown.

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Head short, vertex rather convex, medially covered with sparse punctures, punctation at sides of vertex closely to eyes denser, surface between punctures smooth; ocular sulci well developed, deep, above eyes very wide and extremely deep, forming large impression containing large setiferous pore; frontal calli narrow, separated by frontal ridge, their surface rough, calli delineated by lines from vertex, in some cases area containing calli and nearest part of vertex coarsely puncture-wrinkle sculptured, sometimes calli indistinct; frontal ridge wide, flattened, nearly smooth, anterofrontal ridge flattened, weakly convex; eyes comparatively large, oval, convex; labrum moderately short and wide.

Pronotum subquadrate, in male 1.2–1.3 times as wide as long, nearly equal in length and width in female, rather convex, especially in anterior half and with sharply sloping sides; anterior margin straight, posterior margin forming obtuse angle, lateral edges weakly converging anteriorly, lateral margins nearly straight, thin and smooth, pronotum above anterior angles and along lateral margin distinctly convex, lateral side with clear rounded impression, anterolateral callosities large with well developed, large, projecting angle, posterolateral callosities also well developed, somewhat smaller and angularly projecting; pronotal surface covered with moderately small and shallow punctures, distance between them an average 1.5–2 times their diameter, surface between punctures smooth.

Elytra convex, at base together hardly wider than pronotal base; 1.5–1.6 times longer than wide, maximal width before middle; scutellum small, with obtuse apex, impunctate; humeral calli small, not very convex; sutural angle obtuse, epipleurae smooth; elytra with transversal shallow and narrow impression at basal margin; punctures in striae small, hardly larger than pronotal, not deep, distance between punctures in striae is about diameter of puncture, distance between striae 2–3 times diameter of puncture, striae not deep, well developed at whole distance; interstices flat or slightly convex, covered with a regular row of punctures smaller than strial, interstices between punctures smooth; apical part of second striae (the next after short scutellar) clearly impressed.

Legs thin and straight, first tarsomere of male protarsus poorly widened, just somewhat wider than in female; posterior tibia clearly curved (Fig. 18), inner ridge at tarsal articulation with tooth, first tarsomere of posterior tarsus short and straight.

Aedeagus (Figs 19, 20) with triangular apex, apical sides straight, from base to apex nearly parallel-sided, at ventral side with narrow and moderately deep furrow; at lateral view apex sinuate and curved, then straight and weakly gradually widened towards basal opening; tegmen typically Y-shaped.

Spermatheca (Fig. 22) with short collum, nodulus long and narrow, duct short and moderately thin, not coiled but curved at base.

Body length: male – 2.5–2.7 mm, female – 3.2; body width: male – 1.2–1.3 mm, female – 1.6.

Remarks. The new species is similar to *P. viridana* and *P. cantonensis* from China (Guandong). It differs from *P. viridana* in colouration, a much more convex vertex with distinct punctation on its surface, by, a significantly convex pronotum with smooth interstices, much more curved posterior tibia, and the shape and structure of aedeagus. The new species differs from *P. cantonensis* in colouration, proportions and shape of the body, the more convex vertex, much sparser punctation of pronotum and elytra, more curved posterior tibia and also in shape and structure of aedeagus and spermatheca.

The type material was collected on *Lycianthes lysimachioides* (Wall.) Bitter (Solanaceae).

Distribution. Taiwan (Taoyuan County).

Etymology. The species is named after Mrs. Su-Fang Yu, who collected the type specimens.

Taiwanoliprus endonis Komiya, 2006

Material examined. **Yilan County**. Taiwan: Ilan, Mingchi, 12.IV.2009, leg. M.-H. Tsou, 1 male (TARI); the same locality, 05.IV.2009, 1 male (TARI).

Remarks. Previously known from the type locality in Taoyuan County. The material was collected on *Ampelopsis* sp. (Vitaceae).

In the original description, differences between *Taiwanoliprus wenroni* and of *T. endonis* as stated by the author are based mostly on colouration of the body, structure of elytral apex and aedeagus. *Taiwanoliprus wenroni* is entirely yellowish whereas *T. endonis* with dorsum reddish brown, underside and apical 2/3 of hind femora blackish brown. In the material at our disposal, a specimen identified as *T. endonis* possesses colouration of *T. wenroni* but without emarginate apex of elytron and with the shape of aedeagus as in *T. endonis*. The colouration of other specimen is lighter than in the original description of *T. endonis*. It can be suggested that colouration of the species of this genus is rather variable and could not be a reliable character for distinguishing of species. The structure of aedeagi of both species is rather similar and normally lies within the limits of intraspecific variability as often presented in alticines. Additional study is necessary to either confirmation for species status or synonymization of *T. wenroni*.

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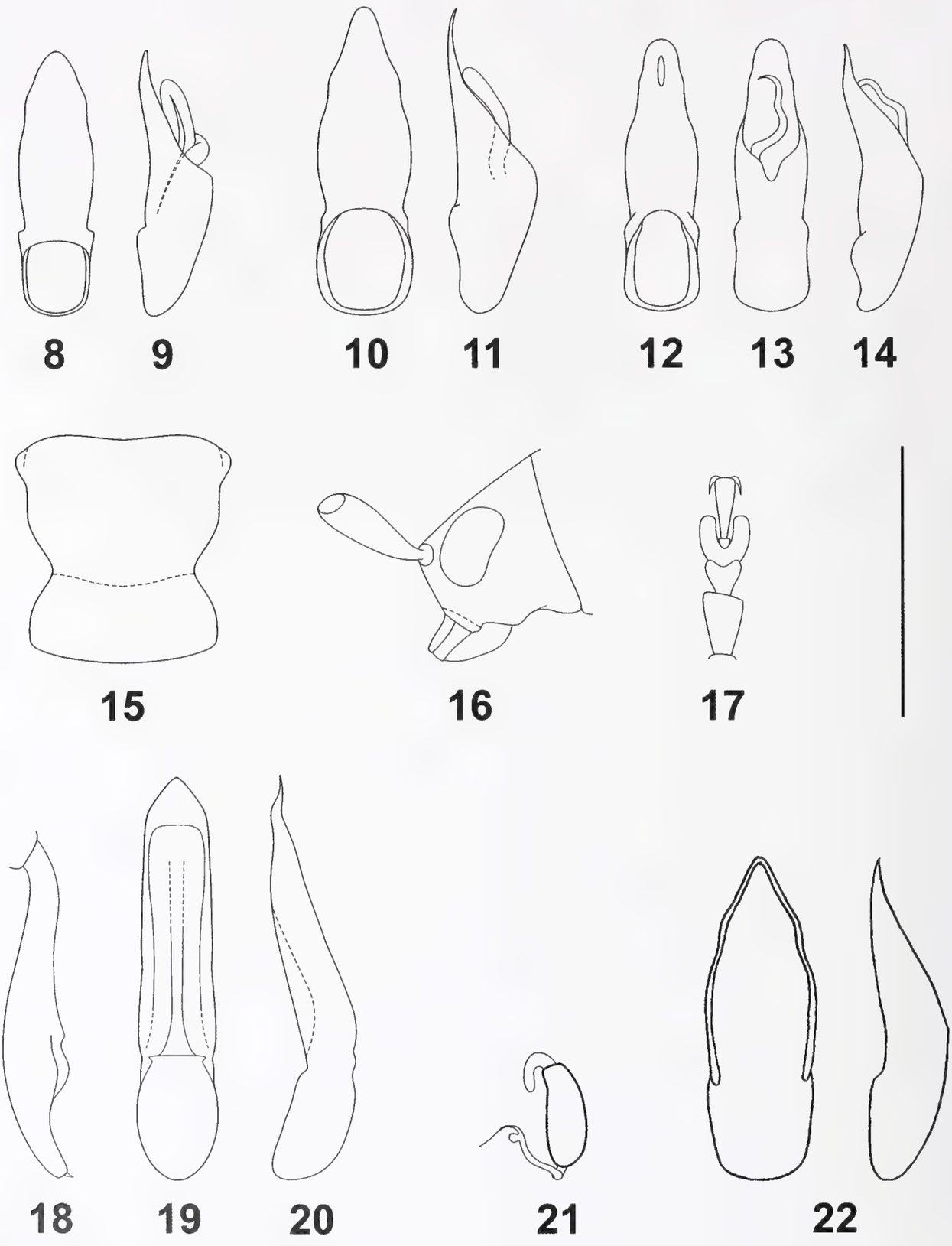

Figs 8–22. 8–17. *Lipromorpha alutacea* Nadein, sp. n. **8–14.** Aedeagus. **8.** ventral view, Anmashan; **9.** lateral view; **10.** ventral view, Hsitou; **11.** lateral view; **12.** ventral view, holotype, Tengchih; **13.** holotype, dorsal view; **14.** lateral view; **15.** prothorax, dorsal view; **16.** head, lateral view; **17.** fore tarsus of male. **18–21.** *Psylliodes yuae* sp. n. **18.** right posterior tibia, inner side; **19.** aedeagus, ventral view, holotype; **20.** aedeagus, lateral view; **21.** spermatheca; **22.** *Lipromorpha montana* Chûjô, aedeagus, ventral view and lateral view (after Kimoto & Takizawa 1997).

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Pseudoliprus kimotonis Komiya, 2006

Material examined. **Taoyuan County**. Taiwan: Taoyuan, Lalashan, 14.V.2009, leg. C.-F. Lee, 3 exx. (TARI); the same locality, 02.IV.2009, leg. H.-G. Chen, 2 exx. (TARI); the same locality, 01.IV.2009, leg. C.-F. Lee, 4 exx. (TARI). **Yilan County.** Taiwan: Ilan, Mingchi, 05.IV.2009, leg. M.-H. Tsou, 2 exx. (TARI). **Taipei County**. Taiwan, Taipei Hsien, Fu-Shan LTER site, lake shore, meadow, swept, 25.III.2003, leg. L. Papp & M. Foldvari, 1 ex. (HNHM). **Xitun District**. Taiwan, Taichung Hsien, Anmashan Mts, 24°14'28.9" N 120 °56'45.8" E, 1800 m, dry creek bed, 5.IV.2003, leg. L. Papp & M. Foldvari, 1 ex. (HNHM).

Remarks. Previously known from Nantou County and Chiayi (East District) after original description. The material was collected on *Actinidia callosa* Lindl. (Actinidiaceae).

Pseudoliprus saigusai Kimoto, 1970

Material examined. **Nantou County**. Taiwan: Nantou, Tatachia, 20.VII.2009, leg. S.-F. Yu, 7 exx (TARI).

Remarks. Previously known from various localites of Nantou County (Kimoto & Takizawa 1997). The material was collected on *Polygonum cuspidatum* Sieb. & Zucc. (Polygonaceae).

Lipromorpha shirozui Kimoto, 1970

Material examined. **Yilan County**. Taiwan: Ilan, Fushan, Chilwuyuan, 20.III.2009, leg. C.-F. Lee, 4 exx. (TARI); Taiwan: Ilan, Mingchi, 05.IV.2009, leg. M.-H. Tsou, 1 ex. (TARI); the same locality, 16.VIII.2008, leg. M.-H. Tsou, 3 exx. (TARI). **Taipei County**. Taiwan: Taipei, Yangmingshan, 07.IX.2007, leg. S.-F. Yu, 1 ex. (TARI); Taiwan, Taipei county, Pi Hu, 3.IV.2002, at light, Gy. Fabian & O. Merkl, 1 ex. (HNHM). **Kaohsiung County**. Taiwan: Kaoshiang, Tengchih, 05.II.2009, leg. S.-E. Yu, 1 ex. (TARI).

Remarks. Previously reported from Nantou County (Kimoto & Takizawa 1997).

Lipromorpha alutacea Nadein, **sp. n.** (Figs 1–3, 8–17)

Type material. Holotype, male. **Kaohsiung County**: Taiwan: Kaoshiang, Tengchih, 05.II.2009, leg. S.-F. Yu (TARI); Paratypes: the same locality, 2 exx. (TARI), 3 exx. (NC); the same locality, 18.II.2007, leg. S.-F. Yu, 4 exx.; the same locality, 26.V.2009, leg. C.-F. Lee, 1 exx. (TARI); Taiwan: Kaoshiang, Shihshan logging trail, 24.III.2009, leg. M.-H. Tsou, 2 exx. (TARI). **Nantou County**. Taiwan: Nantou, Hsitou, 06.V.2009, leg. C.-F. Lee, 1 ex. (TARI). **Taichung County**. Taiwan, Taichung Hsien, Anmashan Mts, 24°14'28.9" N 120 56' 45.8" E, 1800 m, 1800 m, dry creek bed, 5.IV.2003, leg. L. Papp & M. Foldvari, 1 male (HNHM); Taiwan: Taichun, Anmashan, 22.IX.2007, leg. M.-H. Tsou, 1 female. (TARI).

Description. Dorsum, antennae, and legs yellowish-light brown, underside brown except last abdominal segment, apical two thirds of hind femora blackish brown; variations of colouration: sides of pronotum under lateral margin, short stripe on medial part of elytra, short stripe at lateral side of elytra below humeral calli dark brown to nearly black (Figs 1–3).

Head (Fig. 16) short, vertex nearly flat, its surface minutely shagreened, medially impunctate, with a few punctures bearing long setae at sides; frontal calli small, triangular, penetrating between antennal sockets, area above frontal calli triangularly concave and sometimes with shallow short suture, external angles of frontal calli sometimes with a shallow and short sulci reaching margin of eye; frontal part strongly raised, at lateral view vertex and frons forming nearly right angle, frons below antennal sockets triangular, flat, smooth, genae about twice shorter than longitudinal diameter of eye or shorter; labrum transverse, short, mandibulae short, their apices brown to blackish brown; eyes medium-sized, oval, strongly convex; antennae somewhat shorter than body length, 6th and 7th segment equal in length, 8th–10th segment shorter and thicker than previous four segments.

Pronotum (Fig. 15) 1.05–1.13 times longer than wide in male, and 1.07–1.10 times in female; anterior margin slightly curved medially, posterior margin weakly rounded, pronotal base shorter than anterior edge, sides with margin at anterior half, basal constriction deep, lateral sides behind anterolateral callosities more or less deeply grooved, at lateral view pronotal upperside nearly straight or feebly convex medially, anterolateral callosities large, convex, obtuse; pronotal surface densely punctate, distance between punctures do not exceed diameter of puncture, punctures shallow, comparatively large, interstices flat, distinctly and strongly shagreened, covered with short, dense, and decumbent hairs.

Scutellum small, triangular, acute, its surface similar to that of pronotum. Elytra nearly parallel-sided, barely widened just behind middle, 1.55–1.68 (1.61) times longer than width in male, 1.45–1.67 (1.59) times in female; humeral calli strongly raised, impunctate, hind wings completely developed; base of elytra strongly convex, then distinctly concave, apical half convex; apices rounded, sutural angle not acute, obtusely-rounded; punctures very large and deep, arranged in regular striae without tenden-

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cy to confusion, punctures in stria dense, situated directly at each other, striae deeply engraved at whole distance, short scutellar row of punctures usually engraved deeper than others; interstices strongly costate, costae distinct from base to apex, short costa between short scutellar row and next row strongly raised, usually stronger than others, surface of costae impunctate, smoothly and minutely shagreened, each costa bears a row of long, semi-erect, comparatively dense hairs.

Femora distinctly swollen, fore tibiae apically curved; first tarsomere of male slightly broader than in female (Fig. 17).

Aedeagus (Figs 8–14) short, apical third narrow, weakly narrowing apically, apex rounded, medial third broad, nearly parallel-sided, basal third with large basal opening; dorsal opening bears long, thin, and strongly curved flagellum.

Body length: male – 1.9–2.4 mm, female – 2.2–2.5; width: male – 0.9–1.1 mm, female – 1.0–1.1.

Remarks. *Lipromorpha alutacea* resembles *L. montana* Chûjô, 1935 known from type locality in Chiayi County (Alishan), from which it differs in the shape of aedeagus: in *L. montana* (Fig. 22) the apical third of aedeagus is distinctly triangular and acute whereas the apex of *L. alutacea* is triangularly-rounded and obtuse or apical third in some specimens is rounded, not triangular (Figs 8–14); it also differs in the proportions of pronotum and in colouration, especially the black legs and basal segments of abdomen in *L. montana*, whereas the new species has only apical two third of hind femora brownish black.

The type material was collected on *Polygonum chinense* L. (Polygonaceae).

Distribution. Taiwan (Kaohsiung County, Nantou County, Taichung County).

Etymology. The species name refers to characteristic shagreened surface of head, pronotum, and elytral interstices.

Taxonomic note. The name *Lipromorpha cyanea* L. Medvedev, 2009 (Laos) is a junior primary homonym of *Lipromorpha cyanea* Chen et Wang, 1980 (China: Yunnan). In the original description the author stated that *L. cyanea* Medvedev is the only species with metallic blue colouration of the body among the continental species of the genus. That is not correct. According to the original descriptions the both species are highly similar to each other; hence, in view of the fact that Laos and Yunnan Province are bordering it can be suggested that they are conspecific. We do not to propose a new replacement name because the genus currently is under taxonomic revision by the first author. The final decision will be based on the examination of the type material.

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A revision of East Palaearctic *Lobrathium* (Coleoptera: Staphylinidae: Paederinae)

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Abstract. East Palaearctic species of *Lobrathium* Mulsant & Rey, 1878, particularly those of the Himalaya and China, are revised. Thirty-three species, thirty-one of them in *Lobrathium* and two of lobrathioid habitus in *Lathrobium* Gravenhorst, 1802, are described and illustrated: *Lobrathium ablectum* sp. n (China: Hubei); *L. biaculeatum* sp. n. (East Nepal); *L. bicarinatum* sp. n. (North India, Nepal); *L. bicornutum* sp. n. (East Nepal); *L. bimembre* sp. n. (China: Yunnan); *L. bispinosum* sp. n. (China: Guizhou); *L. cholaicum* sp. n. (China: Tibet); *L. configens* sp. n. (China: Shaanxi, Sichuan, Hubei, Yunnan); *L. cornutum* sp. n. (East Nepal); *L. daxuense* sp. n. (China: Sichuan); *L. demptum* sp. n. (China: Hubei); *L. discrepans* sp. n. (North Vietnam); *L. domenoides* sp. n. (China: Sichuan); *L. duplex* sp. n. (China: Sichuan, Yunnan); *L. excisissimum* sp. n. (Yunnan); *L. feldmanni* sp. n. (China: Sichuan); *L. flavipenne* sp. n. (North India: Himachal Pradesh); *L. integrum* sp. n. (East Nepal); *L. kleebergi* sp. n. (Nepal); *L. kosiense* sp. n. (East Nepal); *L. lamellatum* sp. n. (China: Sichuan); *L. mordens* sp. n. (North India); *L. radens* sp. n. (China: Guizhou); *L. retrocarinatum* sp. n. (China: Yunnan); *L. schuelkei* sp. n. (China: Shaanxi); *L. semiflavum* sp. n. (Russian Far East); *L. sinuatum* sp. n. (Central Nepal); *L. spathulatum* sp. n. (China); *L. taureum* sp. n. (China: Hubei, Beijing); *L. tuberosum* sp. n. (China: Jiangxi); *L. unispinosum* sp. n. (Nepal); *Lathrobium lobrathioides* sp. n. (China: Sichuan); *L. lobrathiforme* sp. n. (China: Yunnan). All the previously described species from the Himalaya and China, except for *L. emeiense* Zheng, 1988, and some species from other East Palaearctic regions are redescribed and illustrated. Five new combinations are established: *Lobrathium guttula* (Fauvel, 1895), comb. n. (ex *Lathrobium*); *L. pustulatum* (Cameron, 1931), comb. n. (ex *Lathrobium*); *L. kashmiricum* (Cameron, 1931), comb. n. (ex *Lathrobium*); *Tetartopeus gracilentus* (Kraatz, 1859), comb. n. (ex *Lathrobium*); *T. wui* (Zheng, 2001), comb. n. (ex *Lobrathium*). *Lathrobium sublaeve* Motschulsky, 1858 is excluded from both *Lathrobium* and *Lobrathium*, and treated as Paederini incertae sedis. *Lobrathium ochreonotatum* (Champion, 1922), previously a synonym of *L. semicaeruleum* (Cameron, 1921), is revalidated. *Lobratium shibatai varium* Ito, 1995 is elevated to species rank. Eight synonymies are proposed: *Lobrathium* Mulsant & Rey, 1878 = *Ponthrobium* Korge, 1971, syn. n.; *Lobrathium alticola* (Cameron, 1943) = *L. pirpanjalense* Coiffait, 1982, syn. n.; *L. hongkongense* (Bernhauer, 1931) = *L. sibynium* Zheng, 1988, syn. n., = *L. ryukyuense* Ito, 1996, syn. n.; *L. triste* (Cameron, 1924) = *L. kashmiricum* (Cameron, 1931, syn. n., = *L. afghanicum* Coiffait, 1979, syn. n., = *L. nouristanicum* Coiffait, 1979, syn. n.; *Tetartopeus wui* (Zheng, 2001) = *T. bimaculatum* (Li, Tang & Zhu, 2007), syn. n. Lectotypes are designated for *Lathrobium lederi* Eppelsheim, 1884, *L. badium* Cameron, 1924, *L. brunneum* Cameron, 1931, *L. triste* Cameron, 1924, *L. semicaeruleum* Cameron, 1921, *L. ochreonotatum* Champion, 1922, *L. guttula* Fauvel, 1895, *L. pustulatum* Cameron, 1931, *L. cylindricolle* Cameron, 1924, *L. hongkongense* Bernhauer, 1931, and *L. gracilentum* Kraatz, 1859. *Lobrathium*, according to currently available evidence a Holarctic genus, is now represented in the Palaearctic region by 114 species and one subspecies, the vast majority of which, 87 species and one subspecies, are distributed in the East Palaearctic including Middle Asia, Myanmar, and North Vietnam. The Himalaya (20 species), China (24 species), Taiwan (20 species), and Japan (18 species and one subspecies) are the regions with the greatest diversity. Most species, particularly those with reduced wings and those subject to wing dimorphisms, appear to have remarkably restricted distributions. A catalogue of the *Lobrathium* species recorded from the Palaearctic region and keys to the species of the Himalaya and of China are provided. Some species from China and the Himalaya are subject to pronounced wing dimorphisms. East Palaearctic *Lobrathium* species are partly found near lakes or on banks of rivers and streams, and partly in the leaf litter of forest and shrub habitats at altitudes of 450–4400 m. Additional records of several West Palaearctic species are reported.

Key words. Taxonomy, rove beetles, East Palaearctic region, Himalaya, China, new species, new synonymies, new combinations, revalidation, lectotype designations, key to species, catalogue, diversity, zoogeography, wing dimorphism.

INTRODUCTION

The lathrobiine genus *Lobrathium* Mulsant & Rey, 1878, which had been treated as a subgenus of *Lathrobium* Gravenhorst, 1802 until a few decades ago, probably has an essentially Holarctic distribution. Species from other zoogeographic regions have been attributed to this genus, too, but all those taxa that have been re-examined recently, have turned out to belong to other genera (e.g., Assing in press c).

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According to Smetana (2004), *Lobrathium* is represented in the Palaeactic region by 62 species and three subspecies in three subgenera. In the meantime, however, numerous additional species have been described, one subgeneric and numerous species-group names have been synonymised, one species was transferred to *Tetartopeus* Czwalina, 1888, two to *Pseudolathra* Casey, 1905, and one species previously assigned to *Lathrobium* was moved to *Lobrathium* (Assing 2004, 2005a, 2006a, 2007, 2008, 2010, in press a; Bordoni 2009; Ito 2007, 2009a–c; Shavrin 2008). Moreover, *Lobrathium wui* Zheng, 2001 from China and *L. apogeum* (Normand, 1936) from Algeria had been omitted in the catalogue.

According to Newton et al. (2001), nearly 70 species of *Lobrathium*, two of them adventive, are known from the Nearctic region. However, this figure includes *Pseudolathra* Casey, 1905, which, as most recent authors agree, represents a distinct genus (Assing in press c). According to a database compiled by Newton (unpubl.), there are 36 *Lobrathium* and 33 *Pseudolathra* species in North America north of Mexico (Newton, pers. comm.), and only one of them, *Lobrathium multipunctum* Gravenhorst, 1802, is adventive.

Previous studies have suggested already that the *Lobrathium* fauna of the East Palaearctic is much more diverse than that of the West Palaearctic region. The best-studied regions are Japan and Taiwan. As many as 20 species and subspecies, most of them with more or less restricted distributions, have been reported from Japan alone (Ito 2007, 2009b; Smetana 2004). For the vast majority of these species, illustrations of the male primary sexual characters are available in the literature. According to a recent revision, 20 species, 19 of them endemic, are known from Taiwan (Assing 2010). Remarkably, only seven species have been recorded from mainland China, although this vast, geologically, zoogeographically, and ecologically diverse country is generally known to host a remarkably rich fauna. Aside from the recent revision of the *Lobrathium* species of Taiwan (Assing 2010) and an incomplete key to the *Lobrathium* species of the Himalaya (Coiffait 1982b), which also includes a species of *Pseudolathra*, synoptic taxonomic studies of the East Palaearctic *Lobrathium* fauna are absent.

A recent revision of the Himalayan *Lathrobium* species (Assing in press b) revealed that the type material of several species previously attributed to *Lathrobium* in fact belonged to *Lobrathium* and other genera of Lathrobiina and Medonina. Subsequently, in order to investigate the diversity of *Lobrathium* in the East Palaearctic and to clarify the taxonomic status of previously unrevised *Lobrathium* and *Lathrobium* species, more type and non-type material from various public and private collections was examined. These studies yielded a remarkable number of new species, new synonymies, new combinations, and other taxonomic changes. In addition, new West Palaearctic material examined since the latest instalments (Assing 2007, 2008) to a revision of West Palaearctic *Lobrathium* is reported.

MATERIAL AND METHODS

The morphological studies were conducted using a Stemi SV 11 microscope (Zeiss Germany) and a Jenalab compound microscope (Carl Zeiss Jena). A digital camera (Nikon Coolpix 995) was used for the photographs.
Head length was measured from the anterior margin of the frons to the posterior margin of the head, elytral length at the suture from the apex of the scutellum to the posterior margin of the elytra, the length of the forebody from the anterior margin of the mandibles (in resting position) to the elytral hind margin, and the length of the aedeagus from the apex of the ventral process to the base of the aedeagal capsule. The "parameral" side (i.e., the side where the sperm duct enters) is referred to as the ventral, the opposite side as the dorsal aspect.

The maps were created using MapCreator 2.0 (primap) software. The coordinates of some Himalayan localities were obtained from Ahrens (2004).

COLLECTION MATERIAL DEPOSITORIES

BMNH	The Natural History Museum, London (R. G. Booth)
FMNH	Field Museum of Natural History, Chicago (via L. H. Herman)
MCSNV	Museo Civico di Storia Naturale, Verona (L. Latella; via A. Zanetti)
MHNG	Muséum d'Histoire Naturelle, Genève (G. Cuccodoro)
MMUM	The Manchester Museum, The Manchester University (D. Logunov)
MNHNP	Muséum National d'Histoire Naturelle, Paris (A. Taghavian)
NHMB	Naturhistorisches Museum Basel (M. Brancucci, E. Sprecher)
NHMD	Natural History Museum Denmark/ University of Copenhagen Zoological Museum (A. Solodovnikov)
NHMW	Naturhistorisches Museum Wien (H. Schillhammer)
NME	Naturkundemuseum Erfurt (M. Hartmann, assisted by W. Apfel)
SDEI	Senckenberg Deutsches Entomologisches Institut, Müncheberg (L. Behne)
SF	Senckenberg, Frankfurt/M. (A. Hastenpflug-Vesmanis)
SMNS	Staatliches Museum für Naturkunde, Stuttgart (W. Schawaller, K. Wolf-Schwenninger)
SNSD	Senckenberg Naturhistorische Sammlungen Dresden (O. Jäger)
ZML	Museum of Zoology, Lund University (R. Danielsson)
cAss	author´s private collection
cFel	private collection Benedikt Feldmann, Münster

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cGia private collection Pier Mauro Giachino, Torino, Italy
cKle private collection Andreas Kleeberg, Berlin, Germany
cSch private collection Michael Schülke, Berlin, Germany
cSha private collection Alexey Shavrin, Daugavpils, Latvia
cSme private collection Aleš Smetana, Ottawa, Canada
cWun private collection Paul Wunderle, Mönchengladbach, Germany

RESULTS

Systematic position and identification of genus. *Lobrathium* belongs to the paederine subtribe Lathrobiina, which is represented in the Palaearctic region by twelve genera: *Achenium* Leach, 1819, *Domene* Fauvel, 1873, *Lathrobium* Gravenhorst, 1802, *Lobrathium* Mulsant & Rey, 1878, *Micrillus* Raffray, 1873, *Platydomene* Ganglbauer, 1895, *Pseudobium* Mulsant & Rey, 1878, *Pseudolathra* Casey, 1905, *Scymbalium* Erichson, 1839, *Scymbalopsis* Reitter, 1909, *Tetartopeus* Czwalina, 1888, and *Throbalium* Mulsant & Rey, 1878. The phylogenetic affiliations of the lathrobiine genera have never been comprehensively studied, so that the polarity of most distinguishing characters is unknown and the identification of apomorphies difficult. For keys to the lathrobiine genera represented in the Palaearctic and more detailed diagnoses see Coiffait (1982c) and Assing (2012).

Lobrathium is distinguished from similar genera such as *Lathrobium*, *Pseudolathra*, *Platydomene*, *Pseudobium*, *Pseudolathra*, and *Tetartopeus* by the following character combination:

Body size moderate to large, not conspicuously flattened. Head more or less coarsely punctate and with broad posterior constriction of approximately half the width of head. Pronotum distinctly oblong, usually 1.15–1.35 times as long as broad, with relatively coarse punctation, and without a separate dorsal series of punctures on either side of the usually distinct, impunctate median band. Elytra with rather coarse and usually defined, often seriate punctation; above lateral margin (in lateral view) with additional fine line (evidently secondarily reduced in some species from Taiwan). Male sexual characters: sternite VII often with pronounced modifications (median impression, posterior excision, presence of strongly modified, short and stout black setae); sternite VIII usually with rather large posterior excision and mostly with strongly modified, short and stout black setae; aedeagus without parameres, without strongly sclerotised spines in internal sac; ventral process of aedeagus often more or less blade-shaped and with ventral carinae or tooth-like projections. Female terminalia without conspicuous modifications.

The genera that have been most frequently confused with *Lobrathium* are *Lathrobium*, *Tetartopeus*, *Pseudolathra*, and *Pseudobium*. In *Lathrobium*, the punctation of the forebody, particularly that of the elytra, is mostly less dense, finer, and less defined than in *Lobrathium*, never arranged in series on the elytra, the pronotum is often less convex in cross-section and less oblong, the elytra lack the additional epipleural line, the chaetotaxy of the male sternites VII and VIII is different (often modified, but not with the clusters of short and stout black setae found in *Lobrathium*), the aedeagus often has strongly sclerotised sclerites (spines, hooks, etc.) in the internal sac, and the female terminalia are modified to various degrees (see, e.g., Assing in press b). In *Tetartopeus*, the posterior constriction of the head is more slender (approximately one-third of head width), the elytra lack the submarginal line, the elytral punctation is finer and not seriate, the pubescence of the male sternite VIII is fine and dense, the posterior excision of this sternite is very small and often in more or less asymmetric position, the aedeagus often has pronounced spines in the internal sac and a more or less spine-shaped ventral process, and the female terminalia are modified to various degrees (see, e.g., Assing 2011b). In *Pseudolathra*, the forebody is much more sparsely punctate, the pronotum has a distinct series of punctures on either side of the impunctate median band, the male sternites VII and VIII lack the short stout setae typical of *Lobrathium*, the posterior excision of sternite VIII is – at least in Palaearctic and Oriental species – almost always very deep and narrow, and the aedeagus is of completely different morphology (see Assing in press c). *Pseudobium* species are of more slender habitus, usually much smaller, have a more oblong pronotum (approximately 1.5 times as long as broad), a more finely and sparsely punctate forebody, a more oblong and distinctly subrectangular head with longer postgenae and with the eyes situated before the middle, a more pronounced seriate arrangement of the elytral punctures, a relatively longer metatarsomere I (distinctly longer than II), male sternites VII and VIII without strongly modified setae, and an aedeagus of completely different morphology (for illustrations see, e.g., Assing 2006b).

Intrageneric affiliations. *Lobrathium* is evidently represented in the Palaearctic region by numerous lineages, some of them currently including only one species (e.g., *L. cylindricolle*, *L. discrepans*) and some of them speciose and widespread. However, since many of the species from Japan and from the Nearctic region have not been examined yet, a comprehensive species group concept is neither attempted nor proposed. On the other hand, the subgeneric classification currently in use is highly doubtful. Five species from the Mediterranean and from northeastern Turkey have been attributed to the subgenus *Ponthrobium* Korge, 1971 and the remainder to the nominate subgenus, a systematic concept that is highly artificial for several reasons. *Ponthrobium* is most unlikely to form a monophyletic group, but represented by two lineages, one

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of them including three species (including the type species of *Ponthrobium*) from northeastern Turkey and one comprising two or three species (affiliations of *L. apogeum* unclear) distributed in North Africa and southern Italy. Even more importantly, maintaining *Ponthrobium* as a valid name would undoubtedly render the nominate subgenus paraphyletic and completely distort the true intrageneric phylogenetic affiliations; *Ponthrobium* is most unlikely to form the sister group of all other *Lobrathium* species. Under these circumstances there are two options, either subdivide the nominate subgenus into numerous additional subgenera or synonymise *Ponthrobium*. The latter option is deemed to be in better accordance with the stability of nomenclature, also because the genus has not been fully revised (see above). Hence the following synonymy results: *Lobrathium* Mulsant & Rey, 1878 = *Ponthrobium* Korge, 1971, syn. n.

Diversity and zoogeography. After the revision, *Lobrathium* is represented in the Palaearctic region (including North Vietnam) by 114 species and one subspecies. The fauna of the West Palaearctic, exclusive of Middle Asia, comprises 26 species; the diversity hot spots are located in the Balkans, Turkey, and the Caucasus region. The fauna of the East Palaearctic, including Middle Asia, Myanmar, and North Vietnam, is much more diverse. At present, 88 named species and one subspecies are known from this region, four from Middle Asia (exclusive of Afghanistan), 20 from the Himalaya (including North Afghanistan), 24 from mainland China, 20 from Taiwan, 18 species and one subspecies from Japan, and the remainder from other regions (Siberia, Russian Far East, Myanmar, North Vietnam). The widespread *L. hongkongense* is included in the figures for Japan, Taiwan, and mainland China.

Most of the East Palaearctic *Lobrathium* species have more or less restricted distributions. The most widespread species is *L. hongkongense*, which has been recorded from numerous localities in China, from Taiwan, and from the extreme south of Japan. Interestingly, none of the Himalayan species has been recorded from China, and vice versa. However, at least one species group containing exclusively micropterous and wing-dimorphic species (*L. kosiense*, *L. wittmeri*, *L. cholaicum*, *L. daxuense*, *L. domenoides*, *L. bimembre*, *L. lamellatum*, *L. duplex*) is distributed from Nepal to Sichuan and Yunnan. In the course of the present revision, none of the species from the main islands of Japan was recorded also from continental Asia. The only species that was found to be present in both Japan and continental Asia is *L. hongkongense*, whose distribution in Japan, however, is confined to the extreme south (Ryukyu Islands). Finally, no *Lobrathium* species appears to have a trans-Palaearctic distribution.

The available evidence suggests that the true diversity of the East Palaearctic *Lobrathium* fauna, particularly that of the Himalaya, China, and Taiwan is significantly greater than currently known. In the course of the present revision and of the revision of the species of Taiwan (Assing 2010), a considerable number of probably undescribed species was not described because they were represented only by females. Moreover, numerous named species have been recorded only once or very rarely and seem to have very restricted distributions. Finally, in comparison to the West Palaearctic, Taiwan, and Japan, the faunas of the Himalaya and mainland China have been poorly studied. The taxonomic status of one species, *L. emeiense*, is doubtful, as its male sexual characters are unknown.

Taxonomic changes. In all, 31 species of *Lobrathium* and two species of *Lathrobium* are described for the first time. Seven species-group names are syonymised, six of them in *Lobrathium* and one in *Tetartopeus*. One previously synonymised name, *Lobrathium ochreonotatum*, is revalidated. Five new combinations are established: three names are transferred from *Lathrobium* to *Lobrathium*, and two species, one of them previously in *Lobrathium* and one in *Lathrobium*, are moved to *Tetartopeus*. One previous subspecies from Japan, *L. varium*, is elevated to species.

Di- and polymorphisms. Some species such as the West Palaearctic *L. multipunctum* are subject to remarkable intraspecific (polymorphic) variation of coloration, body size, eye size, elytral length, the length of the hind wings, and other characters.

Conspicuous dimorphisms were observed in several species from the East Palaearctic. *Lobrathium wittmeri* from Nepal, as well as *L. bimembre* and *L. duplex* from China, are represented by two distinct morphs, a macropterous morph with long elytra and fully developed hind wings and a micropterous morph with short elytra, weakly marked humeral angles, and with reduced hind wings. The available evidence suggests that these dimorphisms are not sex-related. Another example of a wing dimorphism may be *L. domenoides*, but the species is currently represented only by a single micropterous male.

Remarkably, several of the Himalayan species are dimorphic regarding the presence or absence of elytral spots. This intraspecific variation is apparently not clinal; on some occasions both morphs were found together. The same was not observed for the spotted *Lobrathium* species from China, though the size of the elytral spot may be subject to considerable variation, particularly so in *L. hongkongense*.

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Natural history. East Palaearctic *Lobrathium* species have been found in various habitats. Many, usually more widespread species seem to primarily inhabit lakeshores and river banks, whereas other species, most of them with restricted distributions, were predominantly collected from the leaf litter of forests.

Unlike the vast majority of East Palaearctic *Lathrobium* species, which, for instance in the Himalaya, are confined to high altitudes of usually at least 2500 m up to approximately 5000 m, East Palaearctic *Lobrathium* species have been recorded also from lower elevations. In the Himalaya, they were collected at altitudes of 450–3100 m, most of them between 1000 and 2800 m. In China, the altitudes range from 150 to 3350 m; one species from Tibet, *L. cholaicum*, was even found at 4400 m. In general, macropterous species inhabiting lakeshores and river banks are found at lower elevations than micropterous and wing-dimorphic species living in forest litter. *Lobrathium alticola*, *L. wittmeri*, *L. daxuense*, *L. bimembre*, *L. lamellatum*, and *L. duplex*, for instance, were found at higher altitudes of 2500–3500 m.

Teneral adults of East Palaearctic *Lobrathium* species were collected during the period from February through September, with most observations from March through July, suggesting that the pre-imaginal development of some species occurs during the cold season. However, the data vary between species.

ADDITIONAL RECORDS FROM THE WEST PALAEARCTIC REGION

Lobrathium multipunctum (Gravenhorst, 1802)

Lathrobium striatopunctatum Motschulsky 1858: 646, preoccupied.

Lathrobium differens Gemminger & Harold 1868: 610, replacement name.

Material examined. Spain: 1 ex., Navarra, Sierra de Andia, Pto. de Lizzarraga, 1050 m, 15.VI.2006, leg. Anichtchenko (cAss); 1 ex. [pale-coloured, brachypterous], Soria, Santa Cruz de Yanguas, Sierra del Hayedo de Santiago, Ayo. de las Monjas, 42.09°N, 2.50°W, 1450 m, 16.VIII.2008, leg. Andújar & Arribas (cAss); 1 ex. [pale-coloured, brachypterous], Soria, La Poveda de Soria, Pto. de Piqueras, 42°06°N, 2.54°W, 1710 m, 16.VIII.2008, leg. Andújar & Arribas (cAss); 1 ex. [pale-coloured, brachypterous], La Rioja, Villoslada de Cameros, Sierra Cebollera, Lomos de Orios, 42.04°N, 2.68°W, 1400 m, 17.VIII.2008, leg. Andújar & Arribas (cAss); 1 ex. [teneral], Madrid, Sierra de Guadarrama, Navacerrada, 1800 m, 5.IX.2001, leg. Anichtchenko (cSha); 1 ex., Castilla-La Mancha, Fuencaliente (CR), Sierra Madrona, Rio Cereceda, 1.X.2005, leg. Lencina & Andújar (cAss); 1 ex., Valencia, Alicante, E Planes, Bco. de la Encantada, 38°48'N, 00°18'W, 480 m, 3.VIII.2008, leg Forcke (cAss); 2 exs., Valencia, Alicante, NW El Castell de Guadalest, Beniarda, 38°41'N, 00°13'W, 400 m, river bank, 9.VIII.2008, leg Forcke (cAss); 1 ex., Valencia, Alicante, NE Benissa, 38°45'N, 00°03'W, 400 m, 10.VIII.2008, leg Forcke (cAss).
Italy: Basilicata: 2 exs., Pignola ris. WWF, Lago Pignola (PZ), 11.VII.1992, leg. Angelini (NHMD, cAss); 2 exs., Policoro (MT), 3.XI.2000, leg. Angelini (NHMD, cAss). **Calabria:** 5 exs., Belvedere Mar., S.S. 18 at Sangineto stream (CS), 15.IV.1994, leg. Angelini (NHMD, cAss); 3 exs., Lao river, 4 km from estuary (CS), 17.VI.1994, leg. Angelini (NHMD, cAss); 4 exs., Santa Maria Cedro, Abatemarco river (CS), 17.VI.1994, leg. Angelini (NHMD); 1 ex., Crotone, Esaro river, 26.X.2003, leg. Angelini (cAss).

Catalogue of the *Lobrathium* species of the Palaearctic region

In the references column, only a selection of relatively recent articles providing descriptions, illustrations, significant records, or containing important nomenclatural changes is listed. The references are abbreviated as follows:
App = Assing (present paper); A04 = Assing (2004); A05 = Assing (2005); A06a = Assing (2006a); A07 = Assing (2007); A08 = Assing (2008); A10 = Assing (2010); A11a = Assing (2011a); A12 = Assing (2012); AS02 = Assing & Schülke (2002); B09 = Bordoni (2009); Ca21 = Cameron (1921); Ca24 = Cameron (1924); Ca31 = Cameron (1931); Ca43 = Cameron (1943); Co67 = Coiffait (1967); Co79 = Coiffait (1979); Co82a = Coiffait (1982a); Co82b = Coiffait (1982b); Co82c = Coiffait (1982c); CZ00 = Ciceroni & Zanetti (2000); G93 = Gusarov (1993); G95 = Gusarov (1995); I95 = Ito (1995); I96a = Ito (1996a); I96b = Ito (1996b); I07 = Ito (2007); I09b = Ito (2009b); Kh39 = Koch (1939); Ko71 = Korge (1971); N36 = Normand (1936); S01 = Solodovnikov (2001); Sh08 = Shavrin (2008); W72 = Watanabe (1972); W98b = Watanabe (1998b); WB73 = Watanabe & Baba (1973); Z88 = Zheng (1988).
Valid names are sorted alphabetically, synonyms by publication year.

Lobrathium Mulsant & Rey, 1878 (type species *Lathrobium multipunctum* Gravenhorst, 1802)
= *Lathrobiella* Casey, 1905 (type species *Lathrobium collare* Erichson, 1840)
= *Lathrotaxis* Casey, 1905 (type species *Lathrobium longiusculum* Gravenhorst, 1802)
= *Ponthrobium* Korge, 1971 (subgenus; type species *Lathrobium heinzi* Korge, 1971)
= *Allobrathium* Coiffait, 1972 (type species *Lathrobium lethierryi* Reiche, 1872)
= *Paralobrathium* Bordoni, 1999 (type species *Lathrobium apicale* Baudi di Selve, 1857)

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taxon	revised distribution	references
ablectum sp. n.	China (Hubei)	App
alaiense Gusarov, 1995	Kyrgyzstan	G95
alticola (Cameron, 1943)	Kashmir	App, Ca43, Co82a
= *pirpanjalense* Coiffait, 1982; syn. n.		
amamiense Ito, 1996a	Japan (Amami Islands)	App, I96a
anale (Lucas, 1846)	NW-Africa; SW-Europe; Canary Islands	A07, Co82c
= *concinnum* (Gougelet & Brisout, 1860)		
= *canariense* (Wollaston, 1865)		
= *oviceps* (Fauvel, 1902)		
= *lostiae* (Dodero, 1916)		
= *rufiventre* Coiffait, 1953		
= *bellesi* Bordoni, 1977		
= *ullbrichi* Coiffait, 1978		
= *rubriventre* Herman, 2003		
angelinii Ciceroni & Zanetti, 2000	S-Italy	A07, CZ00
angulatum Assing, 2005	Greece	A05
apicale (Baudi di Selve, 1857)	Cyprus	A07, AS02, Co82c
= *cypriacum* Jarrige, 1949		
apogeum (Normand, 1936)	Algeria	N36
badium (Cameron, 1924)	N-India (Uttaranchal, Himachal Pradesh)	App, Ca24, Ca31
bettae (Solodovnikov, 2001)	W-Caucasus	S01
biaculeatum sp. n.	E-Nepal	App
bicarinatum sp. n.	N-India (Uttaranchal); Nepal	App
bicornutum sp. n.	E-Nepal	App
bidigitatum Assing, 2010	Taiwan	A10
bilobatum Assing, 2010	Taiwan	A10
bimembre sp. n.	China (Yunnan)	App
bipeniculatum Assing, 2010	Taiwan	A10
bisagittatum Assing, 2010	Taiwan	A10
bispinosum sp. n.	China (Guizhou)	App
brunneum (Cameron, 1931)	N-India: Sikkim	App, Ca31
bureschi (Scheerpeltz, 1937)	Romania, Bulgaria	AS, Co82c
candicum Bordoni, 2009	Greece (Crete)	App, B09
cholaicum sp. n.	China (Tibet)	App
ciliciae Bordoni, 1980	S-Turkey	A04, AS02
coalitum Assing, 2010	Taiwan	A10
configens sp. n.	China (Shaanxi, Sichuan, Hubei, Yunnan)	App
cornutum sp. n.	E-Nepal	App
cornutissimum Assing, 2010	Taiwan	A10
cribricolle (Sharp, 1889)	Japan (Honshu)	App, I96a
cylindricolle (Cameron, 1924)	N-India (Uttaranchal)	App, Ca24, Ca31
daxuense sp. n.	China (Sichuan)	App
demptum sp. n.	China (Hubei)	App
diecki (Saulcy, 1878)	S-Italy (Sicily)	Co82c
digitatum Assing, 2010	Taiwan	A10
discrepans sp. n.	N-Vietnam	App
domenoides sp. n.	China (Sichuan)	App
duplehamatum Assing, 2010	Taiwan	A10
duplex sp. n.	China (Sichuan, Yunnan)	App
emeiense Zheng, 1988	China (Sichuan)	App, Z88
excisissimum sp. n.	China (Yunnan)	App
extensum Assing, 2010	Taiwan	A10
farsicum Assing, 2007	SW-Iran	A07
feldmanni sp. n.	China (Sichuan)	App
flavipenne sp. n.	N-India (Himachal Pradesh)	App
frater (Korge, 1971)	NE-Turkey	Co82c, Ko71

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taxon	revised distribution	references
furcillatum Assing, 2010	Taiwan	A10
gladiatum Zheng, 1988	China (Sichuan)	App, Z88
guttula (Fauvel, 1895); comb. n.	Myanmar	App
hebeatum Zheng, 1988	China (Sichuan, Shaanxi, Yunnan)	App, Z88
heinzi (Korge, 1971)	NE-Turkey	A07, Co82c, Ko71
hokkaidense Ito, 1996	Japan (Hokkaido)	I96b
hongkongense (Bernhauer, 1931)	China; Taiwan; S-Japan (Ryukyu Islands)	A10, App, I96b, Z88
= *sibynium* Zheng, 1988; syn. n.		
= *ryukyuense* Ito, 1996; syn. n.		
indubium (Eppelsheim, 1893)	East Siberia (Baikal region), Russian Far East	App, Co67, Co82c, Sh08
= *altaicum* (Coiffait, 1967)		
integrum sp. n.	NE-Nepal	App
isamutanakai Ito, 2009	Japan (Honshu)	I09b
ishidai Ito, 1996	Japan (Honshu)	I96b
ishizuchiense Ito, 1996	Japan (Shikoku)	I96a
kirgisicum Assing, 2007	Kyrgyzstan	A07
kleebergi sp. n.	Nepal	App
kosiense sp. n.	E-Nepal	App
kuanicum Assing, 2010	Taiwan	A10
lamellatum sp. n.	China (SW-Sichuan)	App
lederi (Eppelsheim, 1884)	Azerbaijan, Russian South European territory, Iran	App, A11a, S01
lethierryi (Reiche, 1872)	Italy (Sicily), Algeria, Tunisia	Co82c
mizunoi Ito, 1996	Japan (Honshu)	I96b
mordens sp. n.	N-India (Uttaranchal, Himachal Pradesh)	App
multipunctum (Gravenhorst, 1802)	Europe; NW-Africa; Nearctic region (adventive)	A07, A08, A12, Co82c, CZ00
= *testaceum* Paykull, 1789 (nom. obl.)		
= *lineare* (Gravenhorst, 1802)		
= *punctatostriatum* (Stephens, 1833)		
= *striatopunctatum* (Kiesenwetter, 1850)		
= *striatopunctatum* (Motschulsky, 1858)		
= *pyrenaicum* (Fairmaire, 1863)		
= *differens* (Gemminger & Harold, 1868)		
= *hispanicum* (Dodero, 1916)		
= *gallienii* (Fagniez, 1917)		
= *endogeum* Coiffait, 1971		
= *cassolai* Coiffait, 1972		
nigripenne Assing, 2010	Taiwan	A10
nipponense Ito, 1995	Japan (Kyushu, Honshu)	I95
novum (Bernhauer & Schubert, 1912)	Tajikistan, Uzbekistan	AS02, G95
= *cognatum* (Eppelsheim, 1892), preocc.		
nudum (Sharp, 1874)	Japan (Kyushu, Honshu, Ryukyu Islands)	App, I96a
ochreonotatum (Champion, 1922); revalid.	N-India; Nepal	App
ohkurai Ito, 1996	Japan (Honshu)	I96b
okamotoi Ito, 1995	Japan (Shikoku)	I95
partitum (Sharp, 1874)	Japan (Kyushu, Honshu)	App
pedes Assing, 2010	Taiwan	A10
penicillatum Assing, 2010	Taiwan	A10
pravum Assing & Schülke, 2002	E-Turkey, Iraq, Iran	A07, A11a, AS02
pustulatum (Cameron, 1931); comb. n.	N-India (Assam)	App, Ca31
radens sp. n.	China (Guizhou)	App
reitteri (Czwalina, 1889)	W-Caucasus	A07, S01
retrocarinatum sp. n.	China (Yunnan)	App
reuteri Assing, 2008	Iraq	A08
riozoi Watanabe, 1972	Japan (Hokkaido)	W72
rotundiceps (Koch, 1939)	China (Zhejiang)	App, K39

taxon	revised distribution	references
rugipenne (Hochhuth, 1851) = *meridionale* (Korge, 1971) = *vicinum* Coiffait, 1972 = *messeniacum* Bordoni, 1986	SE-Europe; Turkey; Caucasus	A07, AS02, Co82c, G93
sahlbergi (Fauvel, 1900)	Kyrgyzstan, Kazakhstan	Co82c, G95
sasajii Ito, 2007	Japan (Honshu)	I07
schillhammeri Assing & Schülke, 2002	SE-Turkey	AS02
schuelkei sp. n.	China (Shaanxi)	App
semicaeruleum (Cameron, 1921)	N-India; E-Nepal	App, Ca21, Ca31
semiflavum sp. n.	Russian Far East	App
shibatai Ito, 1995	Japan (Honshu)	I95
sinuatum sp. n.	C-Nepal	App
smetanai Assing, 2010	Taiwan	A10
solarii (Koch, 1936)	S-Italy	Kh36, Co82c
sororium Assing, 2010	Taiwan	A10
spathulatum sp. n.	China (Sichuan, Shaanxi, Shanxi, Hubei, Zhejiang)	App
spinosum Assing & Schülke, 2002	Albania	AS02
spoliatum Assing, 2010	Taiwan	A10
stimulans Assing, 2010	Taiwan	A10
taiwanense (Watanabe, 1998)	Taiwan	W98b
taureum sp. n.	China (Hubei, Beijing)	App
tortile Zheng, 1988	China (Sichuan, Shaanxi, Hubei)	App, Z88
trapezuntis (Bordoni, 1973)	NE-Turkey	B73, Co82c
triste (Cameron, 1924) = *kashmiricum* (Cameron, 1931); syn. n. = *afghanicum* Coiffait, 1979; syn. n. = *nouristanicum* Coiffait, 1979; syn. n.	N-India (Uttaranchal, Kashmir), Afghanistan, Pakistan	App, Ca24, Ca31, Co79
tuberosum sp. n.	China (Jiangxi)	App
unispinosum sp. n.	Nepal	App
varium Ito, 1995, stat. n.	Japan (Honshu)	I95
wittmeri Coiffait, 1982	C-Nepal	App, Co82b
wunderlei Assing, 2006	S-Turkey	A06a, A07
yagmuri Assing, 2007	SE-Turkey	A07
yoshidai sadoensis Watanabe & Baba, 1973	Japan (Sado Island)	WB73
yoshidai yoshidai Adachi, 1955	Japan (Honshu)	WB73

Yugoslavia: 3 exs., Serbia, Suva planina, Zorebica, 1350 m, 5.V.2006, leg. Stevanović (cAss).

Comment. When *Lathrobium differens* Gemminger & Harold, 1868, a replacement name for the preoccupied *L. striatopunctatum* Motschulsky, 1858, was placed in synonymy with *L. multipunctum* by Assing (2008), the Motschulsky name was erroneously given as *L. multistriatum* Motschulsky, 1858 (unavailable). This lapsus is rectified here.

Lobrathium rugipenne (Hochhuth, 1851)

Material examined: Greece: 3 exs., Chalkidiki, Sithonia, Sarti, 10 m, 40°05'N, 23°59'E, IX.2007, leg. Frisch (MNHUB, cAss); 1 ex., Trikala, Pindos, Hinka, 1500 m, 23.V.2005, leg. Angelini (NHMD).

Comment. This species is distributed from the southern Balkans to the Caucasus region.

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Lobrathium anale (Lucas, 1846)

Material examined. Spain: 2 exs., País Vasco, Guipuzcos, Irun, Plaiaundi, 9.IV.2006, leg. Anichtchenko (cSha); 1 ex., Andalucía, Granada, Rio Darro, barranco de Teatino, 6.II.2005, leg. Anichtchenko (cSha); 1 ex., Andalucía, Córdoba, Charca, Castillo de la Albaida, 15.V.2006, leg. Baena (cAss); 2 exs., Andalucía, Cádiz, 25 km NW Tarifa, Tahivilla, 36°11'N, 5°45'W, 5 m, flooded fallow, under stone, 26.XII.2009, leg. Assing & Wunderle (cAss, cWun); 1 ex., Andalucía, Cádiz, 15 km NW Algeciras, 36°13'N, 5°33'W, 25 m, loamy pasture, under stone, 27.XII.2009, leg. Assing (cAss).
Morocco: 9 exs., N Touya, Ifri cave, 23.IV.1997, leg. Casale (cGia, cAss).

Comment. *Lobrathium anale* is widespread in the western Mediterranean and the Canary Islands.

Lobrathium lederi (Eppelsheim, 1884) (Figs 1–4)

Lathrobium lederi Eppelsheim, 1884: 15 f.

Type material examined. Lectotype ♂, present designation: "Caspi.-M.-Gebiet, Rasano. Leder (Reitter) / Lederi Epp, Verh. naturf. Ver. Brünn, Bd XXII. / Typus / c. Epplsh. Steind. d. / Lectotypus ♂ *Lathrobium lederi* Eppelsheim, desig. V. Assing 2011 / Lobrathium lederi (Eppelsheim), det. V. Assing 2011" (NHMW). Paralectotypes: 1♂: "Caspi.-M.-Gebiet, Liryk. Leder (Reitter) / 1881.1 / Typus" (NHMW); 1♂: "4 / Kaukas Leder, Berge von Talysch. Lirik / Typus / c. Epplsh. Steind. d." (NHMW); 1♀: "Caspi.-M.-Gebiet, Liryk. Leder (Reitter) / Typus / c. Epplsh. Steind. d." (NHMW).

Comment. The original description is based on an unspecified number of syntypes from "Gebirge von Talysch bei Lirik und Rasano" (Eppelsheim 1884). Four syntypes were located in the Eppelsheim collection at the NHMW. A male in good condition is designated as the lectotype. The male primary and secondary sexual characters of the lectotype are illustrated in Figs 1–4.

Lobrathium candicum Bordoni, 2009

Type material examined. Holotype ♂ [teneral]: "Kreta, Kritsi, 13.5.75 / Holotypus Lobrathium candicum n. sp., Bordoni det. 2006 / ZML 2010, 168 / Lobrathium candicum Bordoni, det. V. Assing 2010" (ZML).

Additional material examined. Greece: 1♂ [teneral], W-Crete, bank of Litheos river near Agii Deka, 200 m, 12.V.2001, leg. Apfel (cAss).

Comment. In external and the male sexual characters, including the internal structures of the aedeagus, this species is highly similar to *L. apicale*, from which it is distinguished only by the slightly different shape of the apex of the ventral process of the aedeagus. In *L. candicum*, it is more strongly bent dorsad and has more pronounced lateral carinae and subapical teeth (best visible in lateral view).

THE *LOBRATHIUM* SPECIES OF THE HIMALAYA AND MYANMAR

Key to species

1. Pronotum conspicuously oblong, approximately 1.45 times as long as broad (Figs 119–120). Elytra without submarginal line (lateral view!). Forebody reddish. ♂: sternite VII and VIII as in Figs 121–122; aedeagus 0.8 mm long and with apically bifid ventral process (Figs 123–124). Northern India: Uttaranchal (Fig. 66) ..... ***cylindricolle*** (Cameron)
– Pronotum much less oblong, at most approximately 1.3 times as long as broad. Elytra with submarginal line (lateral view!). Male sexual characters different. 2
2. Large species; length of forebody at least approximately 5.0 mm. Head and pronotum dark-brown. Pronotum at least approximately 1.25 times as long as broad. ♂: ventral process of aedeagus divided into two long processes 3
– Small to moderately large species; length of forebody 2.9–4.9 mm. (One species, *L. badium*, whose forebody may be more than 4.6 mm long, has the head and pronotum bright reddish and a distinctly less oblong pronotum.) ♂: ventral process sometimes apically bifid, but not divided into two long processes ...5
3. Largest Himalayan representative of the genus; length of forebody approximately 7 mm. Macropterous: elytra distinctly longer than pronotum (Fig. 12); hind wings fully developed. Posterior margin of tergite VII with palisade fringe. ♂: sternite VIII as in Fig. 14; aedeagus 2.1 mm long and shaped as in Figs 15–16. Northern India: Sikkim (Fig. 23) ..... ***brunneum*** (Cameron)
– Smaller species; length of forebody less than 6 mm. Micropterous: elytra much shorter, 0.70–0.75 times as long as pronotum (Fig. 18); hind wings reduced. Posterior margin of tergite VII without palisade fringe. ♂: sexual characters different 4
4. ♂: sternite VII more transverse (Fig. 19); sternite VIII less oblong and with larger median impression (Fig. 20); aedeagus 2.4 mm long, with longer and more slender bifid ventral process (Figs 21–22). Eastern Nepal: Taplejung (Fig. 23) ... ***bicornutum*** sp. n.
– ♂: sternite VII less transverse (Fig. 24); sternite VIII more oblong and with smaller median impres-

sion (Figs 25–26); aedeagus 1.8 mm long, with shorter and stouter bifid ventral process (Figs 27–28). Eastern Nepal: Terhathum (Fig. 23) .....***cornutum*** sp. n.

5. On average larger species; length of forebody 4.2–4.9 mm. Head and pronotum bright reddish, distinctly contrasting with the dark-brown to black elytra. Pronotum broad, approximately 1.15 times as long as broad. ♂: sternites VII and VIII as in Figs 7–8; aedeagus approximately 1.3 mm long, with large blade-shaped ventral process (Figs 9–10). Northern India: Uttaranchal and Himachal Pradesh (Fig. 23) .....***badium*** (Cameron)
– On average smaller species; length of forebody 2.9–4.8 mm. Head and pronotum blackish, sometimes with bluish hue. Pronotum in the vast majority of species at least 1.20 times as long as broad. Male sexual characters different 6
6. Posterior margin of tergite VII without palisade fringe. Elytra short, approximately 0.75 times as long as pronotum (Figs 97, 103); hind wings reduced. Small species; length of forebody approximately 3.5 mm at most 7
– Posterior margin of tergite VII with palisade fringe. Elytra longer and hind wings fully developed (except in micropterous morph of *L. wittmeri*). Mostly larger species 8
7. Eyes small, approximately 1/4 the length of postocular region (Fig. 97). Length of forebody approximately 2.9 mm. ♂: sternite VII highly distinctive, with pronounced median impression posteriorly, this impression without pubescence, except for two isolated posterior setae, but margined with dense black setae, anteriorly with short process (Fig. 98); sternite VIII as in Fig. 99; aedeagus 0.85 mm long and shaped as in Figs 100–101. Kashmir (Fig. 66) .....***alticola*** (Cameron)
– Eyes larger, more than half the distance from posterior margin of eye to neck in dorsal view (Fig. 103). Length of forebody approximately 3.5 mm. ♂: sternite VII without such conspicuous modifications (Fig. 104); sternite VIII as in Fig. 105; aedeagus 0.95 mm long and shaped as in Figs 106–107. Eastern Nepal: Kosi (Fig. 89) .....***kosiense*** sp. n.
8. Wing-dimorphic: usually micropterous with elytra 0.70–0.75 times as long as pronotum (Fig. 90) and with reduced hind wings, very rarely macropterous (Fig. 91). Body small; length of forebody 3.0–3.5 mm. Body uniformly blackish; forebody without bluish hue and elytra always without posterior spot. ♂: sternites VII and VIII as in Figs 92–93; aedeagus approximately 1.0 mm long and shaped as in Figs 94–95. Central Nepal (Fig. 41) .....***wittmeri*** Coiffait
– Monomorphic, macropterous species; elytra at least 0.9 times as long as pronotum. Body mostly larger. Forebody often with bluish hue and elytra often with yellowish to reddish spots posteriorly. Male sexual characters different 9
9. Forebody brown to black, without bluish hue. Pronotum often less than 1.25 times as long as broad. Elytra in some species shorter than, or as long as elytra. Length of forebody sometimes greater than 4.0 mm. ♂: sternite VII with or without cluster(s) of short stout modified setae 10
– Forebody black, usually with bluish hue (rare exceptions without bluish hue may be identified only based on the male sexual characters). Pronotum at least 1.25 times as long as broad. Elytra longer than pronotum. Length of forebody 3.0–4.0 mm. ♂: sternite VII never with short stout modified setae 17
10. Forebody uniformly blackish, without elytral spot, rarely with indistinctly paler posterior margin 11
– Forebody brown to black; elytra with elytral spot posteriorly 13
11. Pronotum broad, approximately 1.15 times as long as broad (Fig. 114). Body on average larger; length of forebody 4.2–4.8 mm. ♂: sternite VII with two clusters of short stout modified setae (Fig. 115); sternite VIII with extensive and deep impression and with pair of distinct carinae (Fig. 116); aedeagus 1.5–1.6 mm long and shaped as in Figs 117–118. Northern India: Uttaranchal; central Nepal (Fig. 89) .....***bicarinatum*** sp. n.
– Pronotum at least approximately 1.20 times as long as broad. Body on average smaller; length of forebody 3.6–4.3 mm. ♂: sternite VII without distinctly modified setae; sternite VIII with less pronounced impression and without carinae; aedeagus of different shape 12
12. Coloration of forebody black. On average smaller species; length of forebody 3.6–3.9 mm. ♂: sternite VII strongly modified, with two long processes posteriorly (Fig. 109); sternite VIII with relatively deep and broad posterior excision (Fig. 110); aedeagus approximately 0.95 mm long and shaped as in Figs 106–107. Eastern Nepal: Kosi (Fig. 89) .....***biaculeatum*** sp. n.
– Coloration of forebody brown to black. On average larger species; length of forebody 3.8–4.3 mm. ♂: sternite VII without conspicuous modifications; sternite VIII with even deeper posterior excision (Figs 32–33); aedeagus approximately 1. 3 mm long and with apically spear-shaped ventral process (Figs 34–35). Widespread from northern Afghanistan to northern India (Fig. 23) .....***triste*** (Cameron)
13. Head, except for median dorsal portion, with conspicuously dense punctation. ♂: sternite VII with distinctly modified, short and stout black setae (Figs 69, 73, 79); posterior excision of sternite VIII of subtrapezoid shape, basally often bisinuate (Figs 70, 74, 80); aedeagus with blade-shaped ventral process 14

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– Head with less dense punctation dorsally. ♂: sternite VII without distinctly modified setae; posterior excision of sternite VIII not of subtrapezoid shape; aedeagus of different morphology 16

14. ♂: sternite VII as in Fig. 69; sternite VIII more transverse and with convex lateral margins, its posterior excision not distinctly bisinuate basally (Fig. 70); aedeagus approximately 1.1 mm long and shaped as in Figs 71–72. Nepal (Fig. 41) .....***kleebergi*** sp. n.
– ♂: sternite VII of different shape and chaetotaxy; sternite VIII not distinctly transverse and with concave lateral margins, its posterior excision distinctly bisinuate basally (Figs 74, 80); aedeagus of different shape 15
15. ♂: sternites VII and VIII as in Figs 79–80; aedeagus as in Figs 81–82. Central Nepal (Fig. 90) .....***sinuatum*** sp. n.
– ♂: sternites VII and VIII as in Figs 73–74; aedeagus as in Figs 75–76. Myanmar (Fig. 140) .....***guttula*** (Fauvel)
16. Elytra with large and clear-cut elytral spot (Fig. 84). ♂: sternites VII and VIII as in Figs 85–86; aedeagus 1.5 mm long and with long, slender, and apically very acute ventral process (Figs 87–88). Northern India: Assam (Fig. 89) .....***pustulatum*** (Cameron)
– Elytra with indistinct and ill-defined elytral spot at posterior margin (Fig. 108). ♂: sternite VIII as in Fig. 32; aedeagus approximately 1.3 mm long and with apically spear-shaped ventral process (Figs 34–35). Widespread from northern Afghanistan to northern India .....***triste*** (Cameron)
17. Posterior 2/3 of the elytra yellowish, anterior 1/3 blackish (Fig. 62). ♂: sternite VII with bidomed tubercle posteriorly (Fig. 63); sternite VIII with deep posterior excision (Fig. 67); aedeagus 1.1 mm long and with apically bifid ventral process (Figs 64–65). Northern India: Himachal Pradesh (Fig. 41) .....***flavipenne*** sp. n.
– Elytra with much smaller yellowish to reddish spot posteriorly or uniformly blackish with bluish hue. Male sexual characters different 18
18. ♂: ventral process of aedeagus asymmetric. Specimens with spotted elytra unknown 19
– ♂: ventral process of aedeagus symmetric. Elytra with or without yellowish to reddish spots 20
19. ♂: sternite VII as in Fig. 48; sternite VIII with very small posterior excision (Fig. 49); aedeagus 1.2–1.3 mm long, ventral process stout, on right ventral side (ventral view) with pronounced tooth-shaped process (Figs 50–51). Nepal (Fig. 23) .....***unispinosum*** sp. n.
– ♂: sternite VII as in Fig. 54; sternite VIII with profound posterior excision (Fig. 55); aedeagus 1.4 mm long and with slender ventral process without tooth (Figs 56–57). Northeastern Nepal: Taplejung .....***integrum*** sp. n.
20. ♂: aedeagus 1.2–1.3 mm long, ventral process very slender, sting-shaped in ventral view (Figs 44–45); sternite VII as in Fig. 42; sternite VIII with broad posterior excision of almost semi-circular shape (Fig. 43). Northern India: Uttaranchal, Himachal Pradesh (Fig. 41) .....***mordens*** sp. n.
– ♂: aedeagus shorter, ventral process shorter and stouter; sternite VIII of different shape 21
21 ♂: aedeagus approximately 1.0 mm long, ventral process apically bifid (Figs 39–40); sternite VIII with deep and U-shaped posterior excision (Fig. 37). Elytra usually of uniformly black coloration, rarely with posterior spots. Northern India, eastern Nepal (Fig. 41) .....***semicaeruleum*** (Cameron)
– ♂: aedeagus approximately 0.9 mm long, ventral process apically not bifid (Figs 60–61); sternite VIII with less deep and broader posterior excision (Fig. 59). Elytra usually with, rarely without posterior spots. Northern India, Nepal (Fig. 66) .....***ochreonotatum*** (Champion)

***Lobrathium badium* (Cameron, 1924)** (Figs 5–10, 23)
Lathrobium (Lobrathium) badium Cameron, 1924: 193 f.

Type material examined. Lectotype ♂, present designation: "R. Song, Dehra Dun. / Dr. Cameron. 2.IV.1922. / Syntype / M.Cameron. Bequest. B.M. 1955–147. / Syntype Lathrobium badium Cam., det. R.G. Booth 2011 / Lectotype ♂ *Lathrobium badium* Cameron, desig. V. Assing 2011 / Lobrathium badium (Cameron), det. V. Assing 2011" (BMNH). Paralectotype ♂ [aedeagus missing]: "Dhobi Ghat, Mussoorie. Dr. Cameron. 14.IV.22. / Lathrobium badium Cam. / Type / M.Cameron. Bequest. B.M. 1955–147." (BMNH).

Comment. The original description is based on an unspecified number of syntypes, among them at least one male, from "Mussoorie District; Dhobi Ghat, Keyarkuli, 6000 feet above the sea. Dehra Dun District; Nim Nadi, Song River" (Cameron 1924). Two male syntypes from Dehra Dun and Dhobi Ghat were located in the Cameron collection at the BMNH. The specimen from Dehra Dun is designated as the lectotype; no aedeagus was found in the male from Dhobi Ghat.

Additional material examined. India: Uttaranchal: 3 exs., Garhwal, 16 km from Srinagar, 550 m, 29.X.1979, leg. Löbl (MHNG, cAss); 1 ex., Garhwal, 20 km S Chamba, 1150 m, 20.X.1979, leg. Löbl (MHNG); 1 ex., Garhwal, between Tehri and Srinagar, 900 m, 25.X.1979, leg. Löbl (MHNG); 1 ex., Garhwal, 22 km N Rishikesh, 450 m, 30.X.1979, leg. Löbl (MHNG); 2 exs., Kumaon, 10 km from Ramnagar, Garjia, 450 m, 15.X.1979, leg. Löbl (MHNG, cAss); 1♀, Haldwani district, Kaldhunga, 26.III.1923, leg. Champion (cAss). **Himachal Pradesh:** 1♀, Mandi, Dhelu ["Dhelu, Mandi, Punjab"], ca. 1500 m, leg. Champion (BMNH); 1♀, Baijnath [32°02'N, 76°38'E], ca. 1100 m, leg. Champion (BMNH).

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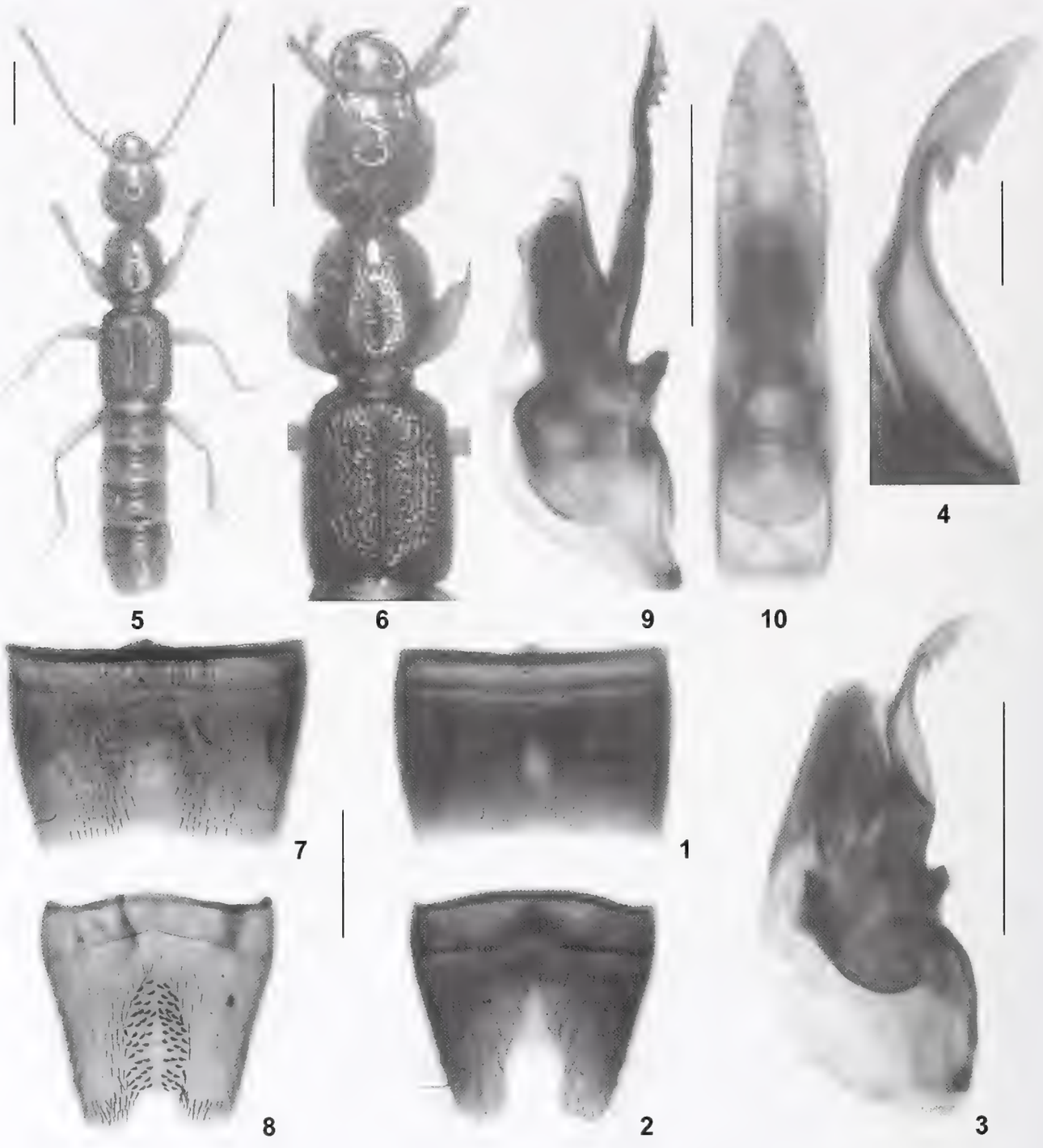

Figs 1–10. *Lobrathium lederi*, lectotype (**1–4**), and *L. badium* (**5–10; 5–6, 8:** paralectotype). **1, 7:** male sternite VII; **2, 8:** male sternite VIII; **3, 9:** aedeagus in lateral view; **4:** apex of ventral process of aedeagus in lateral view; **5:** habitus; **6:** forebody; **10:** aedeagus in ventral view. Scale bars: 5–6: 1.0 mm; 1–3, 7–10: 0.5 mm; 4: 0.1 mm.

Redescription. Body length 8.2–10.5 mm; length of forebody 4.2–4.9 mm. Habitus as in Fig. 5. Coloration: head and pronotum bright-reddish to dark-reddish; elytra dark-brown to blackish, sometimes with reddish posterior margin; abdomen reddish-brown with paler apex or reddish with infuscate apex; legs yellowish to reddish; antennae reddish to reddish-brown.

Head (Fig. 6) as wide as long; posterior angles broadly rounded, almost obsolete; punctation of lateral and posterior dorsal portion very dense and moderately coarse, interstices reduced to narrow ridges; median dorsal portion and middle of frons more or less impunctate; interstices without microsculpture. Eyes large, half as long as distance from posterior margin of eye to neck, or slightly larger.

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Pronotum (Fig. 6) approximately 1.15 times as long as broad and 0.9 times as wide as head; punctation similar to that of head, but less dense.

Elytra approximately as long as, and distinctly wider than pronotum (Fig. 6); punctation coarse and dense, not arranged in distinct series; interstices without microsculpture. Hind wings present.

Abdomen narrower than elytra; punctation fine and dense; posterior margin of tergite VII with palisade fringe.

♂: posterior margin of tergite VIII weakly convex; sternite VII strongly transverse and with impunctate median impression posteriorly, on either side of this impression with cluster of moderately sparse black setae, posterior margin broadly and distinctly concave (Fig. 7); sternite VIII approximately as long as broad, impressed along the middle, this impression with numerous short modified black setae, posterior excision relatively small, on either side of this excision with cluster of black setae (Fig. 8); aedeagus approximately 1.3 mm long, with large blade-shaped ventral process (Figs 9–10).

Distribution and natural history. The known distribution of *L. badium* is confined to several localities in Uttaranchal and two localities in Himachal Pradesh, North India (Fig. 23). The species has been collected at altitudes of 450 to almost 2000 m.

***Lobrathium brunneum* (Cameron, 1931)** (Figs 11–16, 23)

Lathrobium brunneum Cameron, 1931: 252.

Type material examined. Lectotype ♂, present designation: "Sikkim: Gopaldhara, Rungbong Vall. H. Stevens. / Lathrobium brunneum Cam Type ♂ / Type / Lectotypus ♂ *Lathrobium brunneum* Cameron, desig. V. Assing 2011 / Lobrathium brunneum (Cameron), det. V. Assing 2011" (BMNH).

Comment. The original description is based on an unspecified number of syntypes, among them at least one male, from "Sikkim: Rungbong Valley" (Cameron 1931). A male syntype was located in the collections of the BMNH; it is designated as the lectotype.

Redescription. Body length 11 mm; length of forebody 7 mm. Habitus as in Fig. 11. Coloration: head and pronotum dark-brown; elytra reddish-brown; abdomen dark-brown with slightly paler apex; legs brown; antennae dark-brown.

Head (Fig. 12) distinctly oblong, approximately 1.1 times as long as broad; posterior angles weakly marked, broadly rounded; punctation dense and and not very coarse, median dorsal portion impunctate; interstices without microsculpture. Eyes large, approximately half the length of distance between posterior margin of eye to neck in dorsal view. Antenna long and slender, 4.8 mm long.

Pronotum (Fig. 12) 1.28 times as long as broad and 0.87 times as wide as head, lateral margins straight, weakly converging posteriorly in dorsal view; punctation similar to that of head.

Elytra long, 1.12 times as long as pronotum (Fig. 12); humeral angles marked; punctation coarse and dense, indistinctly arranged in series; interstices without microsculpture. Hind wings fully developed.

Abdomen narrower than elytra; punctation very fine and dense; interstices with fine and shallow microsculpture; posterior margin of tergite VII with palisade fringe.

♂: tergite VIII obtusely pointed posteriorly (Fig. 13); sternite VII with weakly concave posterior margin; sternite VIII with shallow median impression posteriorly, this impression with weakly modified pubescence, posterior excision moderately deep, relatively narrow, and almost V-shaped (Fig. 14); aedeagus 2.1 mm long, ventral process conspicuously bifid, of highly characteristic shape (Figs 15–16).

Comparative notes. *Lobrathium brunneum* is readily distinguished from its congeners by its enormous size, its conspicuously long antennae, and the distinctive male sexual characters.

Distribution. This species is currently known only from the type locality in Sikkim, northern India (Fig. 23).

***Lathrobium bicornutum* sp. n.** (Figs 17–23)

Type material. Holotype ♂ [teneral; somewhat damaged; dissected prior to present study]: "Nepal-Expeditionen Jochen Martens / 356 Taplejung Distr., Omje Kharka NW Yamputhin, mature mixed broad-leaved forest, 2300–2500 m, 1–6 May88 Martens & Schawaller / Lobrathium n. sp., det. 1990 G. de Rougemont / Holotypus ♂ *Lobrathium bicornutum* sp. n., det. V. Assing 2011" (SMNS). Paratype ♀: same data as holotype (cAss).

Etymology. The specific epithet (Latin, adjective: with two horns) refers to the shape of the ventral process of the aedeagus.

Description. Body length 9.5–10.3 mm; length of forebody 5.2–5.6 mm. Habitus as in Fig. 17. Coloration: head, pronotum, and abdomen dark-brown to blackish-brown; elytra dark reddish-brown; legs and antennae reddish.

Head (Fig. 18) approximately 1.1 times as long as broad; posterior angles weakly marked, broadly rounded; punctation dense and moderately coarse, frons and vertex sparsely punctate; interstices without microsculpture. Eyes not projecting from lateral contours of head and small, ap-

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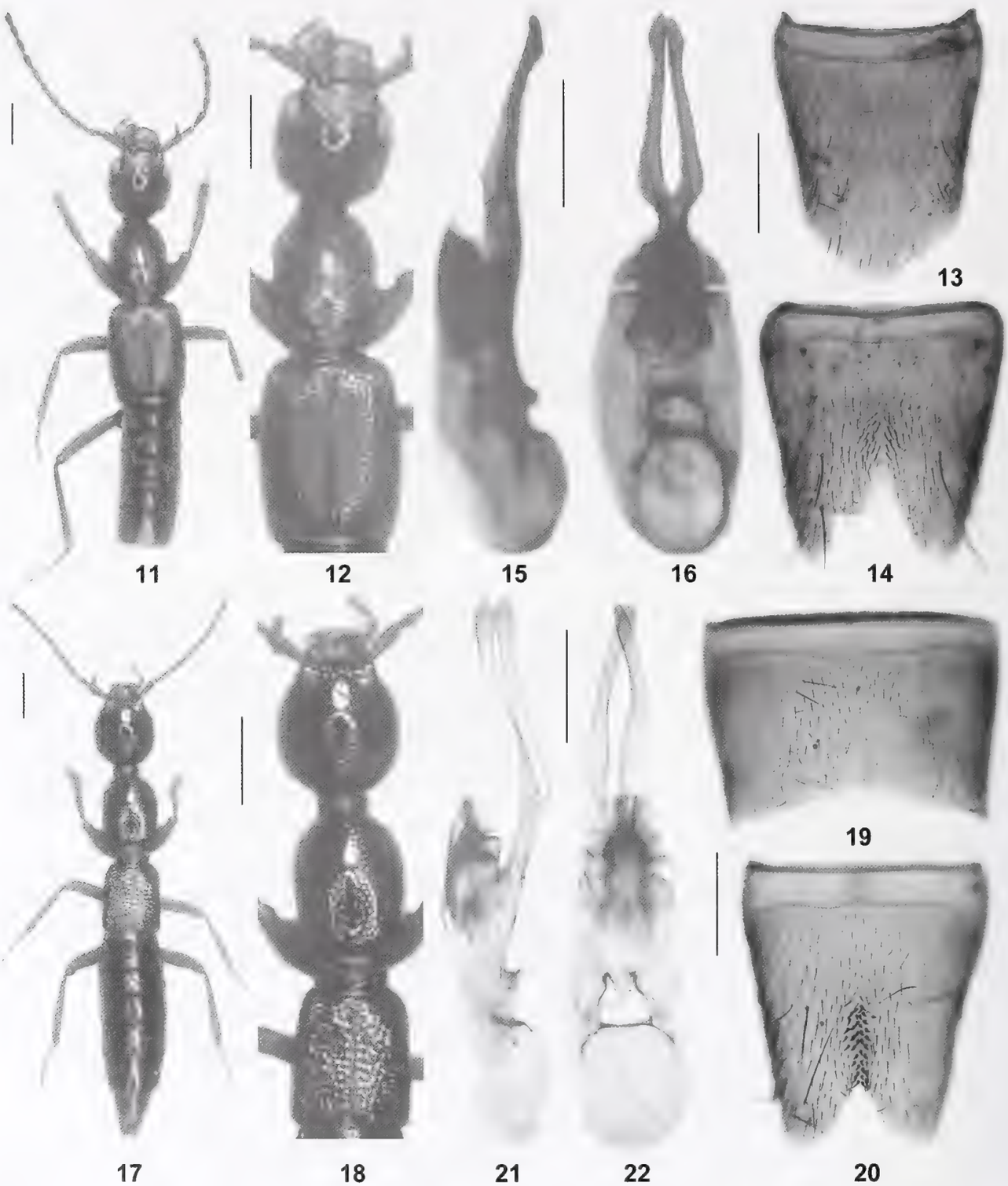

Figs 11–22. *Lobrathium brunneum*, lectotype **(11–16)**, and *L. bicornutum* **(17–22)**. **11, 17:** habitus; **12, 18:** forebody; **13:** male tergite VIII; **14, 20:** male sternite VIII; **15–16, 21–22:** aedeagus in lateral and in ventral view; **19:** male sternite VII. Scale bars: 11–12, 17–18: 1.0 mm; 13–16, 19–22: 0.5 mm.

proximately 0.20–0.25 times as long as distance between posterior margin of eye to neck in dorsal view. Antenna 3.1–3.6 mm long.

Pronotum (Fig. 18) 1.25–1.30 times as long as broad and 0.90–0.95 times as wide as head, lateral margins convex in dorsal view; punctation as coarse as that of head, but distinctly sparser; interstices glossy.

Elytra (Fig. 18) short, 0.70–0.75 times as long as pronotum; humeral angles weakly marked; punctation coarse and dense, but shallow, not arranged in series; interstices

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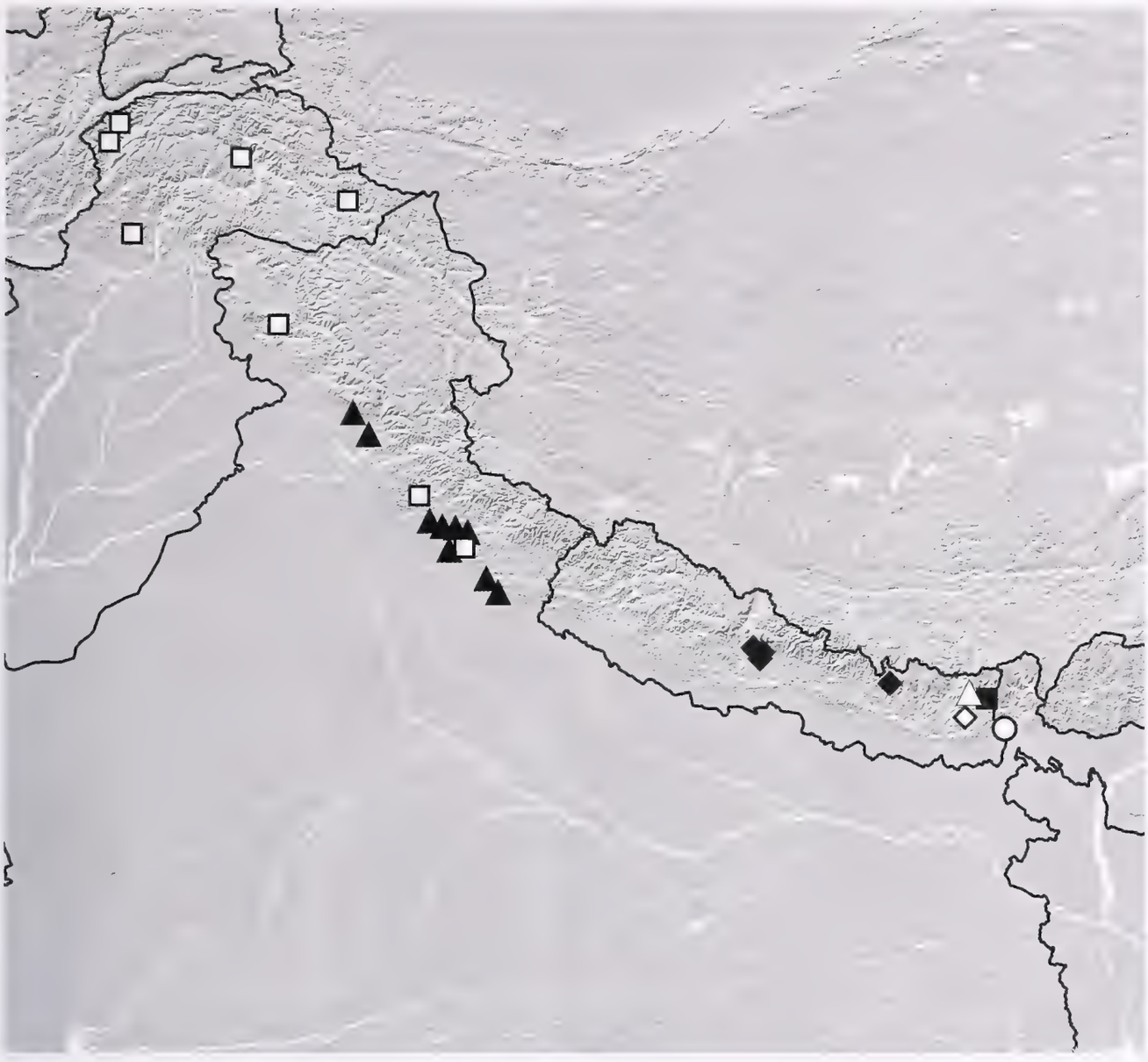

Fig. 23. Distributions of Himalayan *Lobrathium* species, based on revised records: *L. triste* (open squares); *L. badium* (filled triangles); *L. unispinosum* (filled diamonds); *L. cornutum* (open diamond); *L. integrum* (open triangle); *L. bicornutum* (filled square); *L. brunneum* (open circle).

without microsculpture. Hind wings reduced. Protarsi without sexual dimorphism, moderately dilated in both sexes.

Abdomen broader than elytra; punctation very fine and dense, slightly less dense on posterior than on anterior tergites; interstices with fine and shallow, or almost obsolete microsculpture; posterior margin of tergite VII without palisade fringe; posterior margin of tergite VIII convex.

♂: sternite VII with shallow median impression posteriorly, with sparse unmodified pubescence, and with weakly concave posterior margin (Fig. 19); sternite VIII with narrow median impression posteriorly, this impression with distinctly modified, short and stout black setae, posterior excision moderately deep, relatively narrow, and almost V-shaped (Fig. 20); aedeagus 2.4 mm long, ventral process deeply bifid, of characteristic shape (Figs 21–22).

Comparative notes. *Lobrathium bicornutum* is readily distinguished from the similarly large *L. brunneum* by the much smaller eyes, much shorter elytra, reduced hind wings, the absence of a palisade fringe at the posterior margin of the abdominal tergite VIII, and by the male sexual characters.

Distribution and natural history. The type locality is situated in Taplejung district, eastern Nepal (Fig. 23). The specimens were collected in a mature mixed deciduous forest at an altitude of 2300–2500 m. The holotype is teneral.

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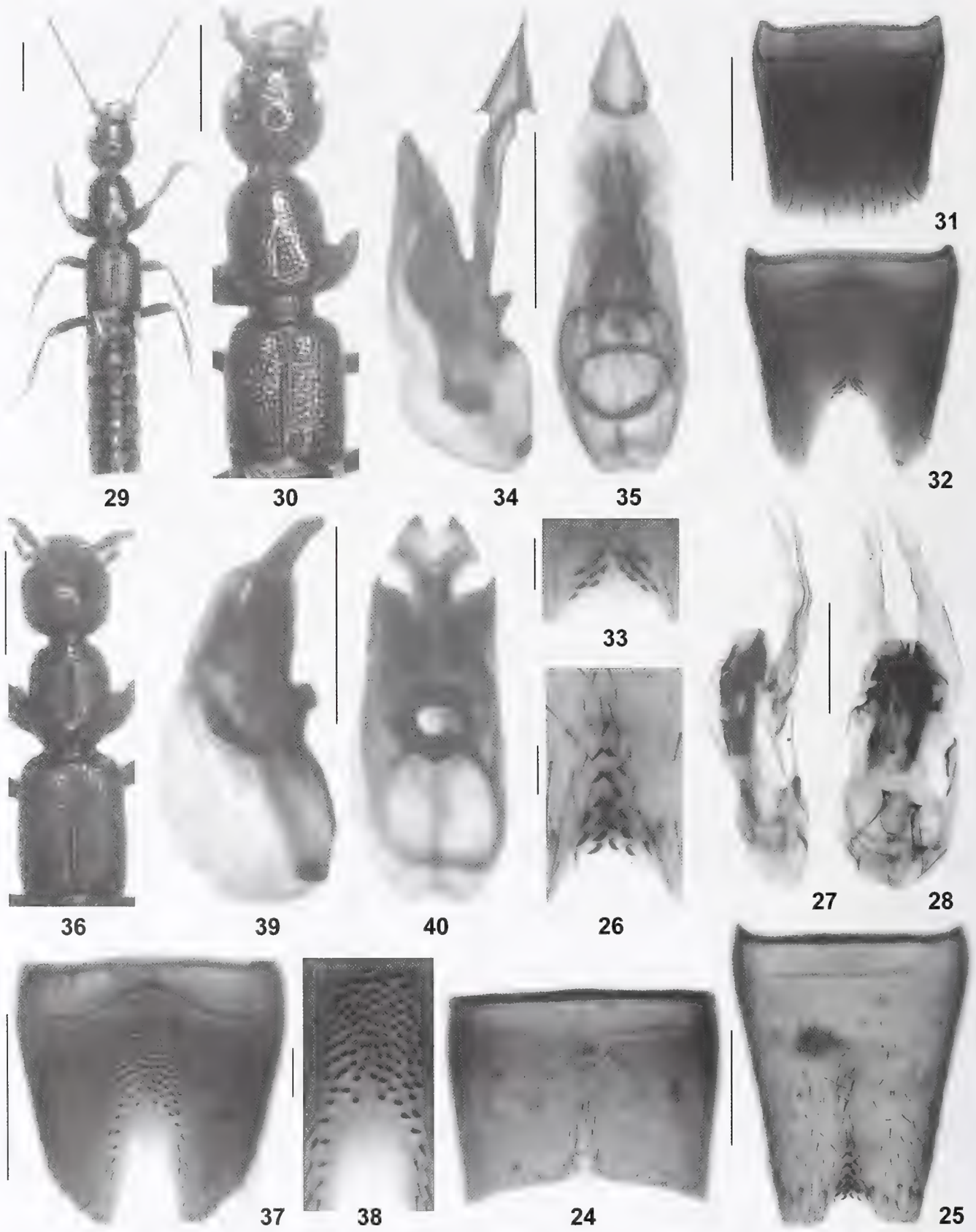

Figs 24–40. *Lobrathium cornutum* **(24–28)**, *L. triste*, lectotype **(29–35)**, and *L. semicaeruleum*, lectotype **(36–40)**. **24:** male sternite VII; **25, 32, 37:** male sternite VIII; **26, 33, 38:** posterior median portion of male sternite VIII; **27–28, 34–35, 39–40:** aedeagus in lateral and in ventral view; **29:** habitus; **30, 36:** forebody; **31:** tergite VIII. Scale bars: 29–30, 36: 1.0 mm; 24–25, 27–28, 31–32, 34–35, 37, 39–40: 0.5 mm; 26, 33, 38: 0.1 mm.

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***Lathrobium cornutum* sp. n.** (Figs 23–28)

Type material. Holotype ♂ [teneral; somewhat damaged; dissected prior to present study]: "Nepal-Expeditionen Jochen Martens / 2978 Terhathum Dist., Tinjura Dara, 2450–2850 m, artenreicher Laubmischwald, 17 Sep 83 Martens & Daams l. / L. lasallei Coiff.? det. 198 [sic] G. de Rougemont / Lobrathium n. sp. det. 1990 G. de Rougemont (also in coll. Rgmt.) / Lobrathium n. sp., det. 1990 G. de Rougemont / Holotypus ♂ *Lobrathium cornutum* sp. n., det. V. Assing 2011" (SMNS). Paratype ♀ [teneral]: same data as holotype (cAss).

Etymology. The specific epithet (Latin, adj.: with horns) refers to the shape of the ventral process of the aedeagus.

Comment. Both type specimens have been subject to post-mortem darkening, evidently as a result of exposure to a chemical of unknown identity.

Description. Length of forebody 5.0–5.4 mm. External characters highly similar to those of *L. bicornutum*.

♂: sternite VII moderately transverse, with shallow median impression posteriorly, with sparse unmodified pubescence, and with weakly concave posterior margin (Fig. 24); sternite VIII strongly oblong, with small median impression posteriorly, this impression with few distinctly modified, short and stout black setae, posterior excision small and almost U-shaped (Figs 25–26); aedeagus 1.8 mm long, ventral process deeply bifid, of characteristic shape (Figs 27–28).

Comparative notes. *Lobrathium cornutum* is reliably distinguished from the similar *L. bicornutum* only by the male sexual characters: the less transverse sternite VII, the more oblong sternite VIII with a smaller median impression, with fewer modified setae, and with a smaller posterior excision, as well as the slightly shorter aedeagus with a shorter and stouter bifid ventral process.

Distribution and natural history. The type locality is situated in Terhathum district, Kosi Zone, eastern Nepal (Fig. 23). The teneral specimens were collected in a mixed deciduous forest at an altitude of 2450–2850 m.

***Lobrathium triste* (Cameron, 1924)** (Figs 23, 29–35, 108)
Lathrobium (Lobrathium) triste Cameron, 1924: 193.
Lathrobium kashmiricum Cameron, 1931: 202 f.; **syn. n.**
Lobrathium afghanicum Coiffait, 1979: 562; **syn. n.**
Lobrathium nouristanicum Coiffait, 1979: 562 f.; **syn. n.**

Type material examined. *L. triste*: lectotype ♂, present designation: "Chakrata Dist. Manjgaon 6500, Dr. Cameron. 21.V.22 / Lathrobium triste Cam. / Type / M.Cameron. Bequest. B.M. 1955–147. / Lectotypus ♂ *Lathrobium triste* Cameron, desig. V. Assing 2011 / Lobrathium triste (Cameron), det. V. Assing 2011" (BMNH).

L. kashmiricum: syntype ♀ [somewhat damaged, left hind leg and apical half of right antenna missing]: "Type / Ramsu 4500, Chenab Valley, Kashmir. 8.V.28. B.M. Bhatia. / Under wet stones / 308 / Lathrobium kashmiricum Cam. Type / M. Cameron. Bequest B.M. 1955–147. / Lobrathium triste (Cameron), det. V. Assing 2012" (BMNH).

L. nouristanicum: holotype ♀: "entre Camdech et Kouchtous, 1400–2000 m, 8.76 / Afghanistan L et M / Holotype / Lobrathium nouristanicum H. Coiffait det. 1978 / Lobrathium triste (Cameron), det. V. Assing 2012" (MNHNP).

Comment. The original description of *L. triste* is based on an unspecified number of syntypes, among them at least one male, from "Chakrata District; Manjgaon, Dodora Khud, Chulli Khud, 6500 to 8000 feet above the sea" (Cameron 1924). A male syntype from Manjgaon was located in the Cameron collection at the BMNH and designated as the lectotype.

The original description of *L. kashmiricum* is based on an unspecified number of syntypes from "Kashmir: Ramsu, Chenab Valley, alt. 4500 feet" (Cameron 1931). The male sexual characters are not described, suggesting that male syntypes were not available. An examination of a female syntype, possibly the only type specimen that exists, yielded no evidence whatsoever that it should not be conspecific with *L. triste*. It represents the colour morph with indistinct posterior spots on the elytra. Moreover, the type locality is well within the range of *L. triste*. Therefore, the available evidence suggests that the syntype of *L. kashmiricum* is conspecific with the lectotype of *L. triste*; hence the synonymy proposed above. The syntype of *L. kashmiricum* is illustrated in Fig. 108.

Lobrathium afghanicum was described from a male syntype collected in "Darah i Nour" and three male paratypes from "Gorges du Tanguy Garou, Maïpar" (Coiffait 1979). The type material was not examined, but based on the illustration of the characteristic aedeagus provided in the original description, *L. afghanicum* is undoubtedly conspecific with *L. triste*; hence the synonymy proposed above.

According to the original description of *L. nouristanicum*, which is based on a unique female from "Nouristan, entre Camdech et Kouchtous" (Coiffait 1979), this species is distinguished from *L. afghanicum* (there is no mention of *L. triste*) by smaller size, more slender habitus, relatively smaller eyes, longer elytra without posterior spots and with the punctation arranged in more distinct series. An examination of the holotype revealed that, in all these characters, it is well within the range of intraspecific variation of *L. triste*, suggesting that it is conspecific with this species. Consequently, *L. nouristanicum* is placed in synonymy with *L. triste*.

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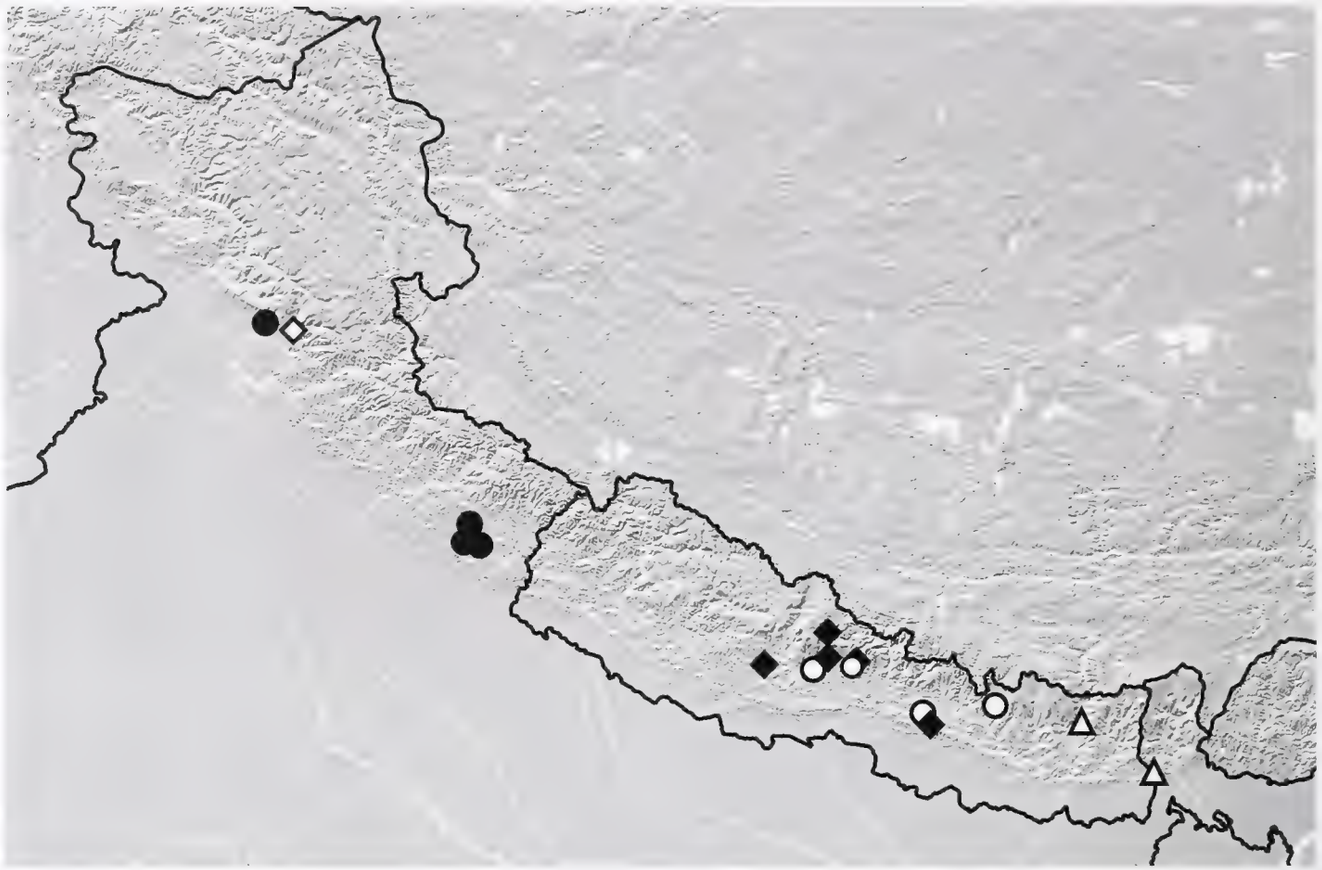

Fig. 41. Distributions of Himalayan *Lobrathium* species, based on revised records: *L. mordens* (filled circles); *L. flavipenne* (open diamond); *L. wittmeri* (filled diamonds); *L. kleebergi* (open circles); *L. semicaeruleum* (open triangles).

Additional material examined. Pakistan: 1♂, Chitral, Garam Chashma, 1900–2800 m, 1.–2.VII.1982, leg. Erber & Heinz (cAss); 2♂♂, Swat Marghuzar, 1300 m, 8.V.1983, leg. Besuchet & Löbl (MHNG, cAss); 1♂, 6♀♀, Chitral, Lotkoh, 2350 m, 29.V.1983, leg. Besuchet & Löbl (MHNG, cAss); 1♀, Northwest Frontier Province, Hazara, Lower Kagan Valley, ca. 1100 m, 24.V.1927, leg. Champion (BMNH); 2 exs., Kargah valley near Gilgit, 26.X.2008, leg. Latella (MCSNV, cAss); 2 exs., Ghangche district, Hushey valley, 25.–29.VI.2008, leg. Latella (MCSNV).

India: 1♀ [labelled as "Cotype" of *L. triste*], Chakrata district, Binal Gad, 28.V.1922, leg. Cameron (MHNG).

Redescription. Body length 7.3–8.3 mm; length of forebody 3.8–4.3 mm. Habitus as in Fig. 29. Coloration: body reddish-brown to blackish, elytra sometimes with ill-delimited yellowish to reddish spots posteriorly; legs uniformly reddish to dark-brown with even darker femora; antennae reddish, with antennomere I sometimes infuscate.

Head (Figs 30, 108) weakly oblong, approximately 1.05 times as long as broad; posterior angles broadly rounded, practically obsolete; punctation dense and coarse, median dorsal portion sparsely punctate; interstices without microsculpture. Eyes large and bulging, slightly more than half as long as distance from posterior margin of eye to neck.

Pronotum (Figs 30, 108) approximately 1.25 times as long as broad and nearly as wide as head; punctation similar to that of head, but less dense.

Elytra (Figs 30, 108) 0.90–0.95 times as long as, and distinctly wider than pronotum; punctation coarse and dense, arranged in somewhat irregular series; interstices without microsculpture. Hind wings present.

Abdomen narrower than elytra; punctation moderately fine and moderately dense (less fine and less dense than in *L. badium*); posterior margin of tergite VII with palisade fringe.

♂: posterior margin of tergite VIII weakly convex (Fig. 31); sternite VII transverse and with median impression posteriorly, posterior margin broadly and distinctly concave; sternite VIII approximately as long as broad, posterior excision very deep and rather broad, anterior to this excision with small cluster of modified, short black setae (Figs 32–33); aedeagus approximately 1.3 mm long, with conspicuously spear-shaped ventral process (Figs 34–35).

Distribution. *Lobrathium triste* has been recorded from North India (Uttaranchal), Kashmir (Smetana 2004), Afghanistan, and Pakistan (Fig. 23).

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***Lobrathium semicaeruleum* (Cameron, 1921)** (Figs 36–41)
Lathrobium semicaeruleum Cameron, 1921: 271.

Type material examined. Lectotype ♂, present designation: "Gopaldhara, Br. Sikkim. H. Steven. / L. semicaeruleum / Type / M.Cameron. Bequest. B.M. 1955–147. / Lectotypus ♂ *Lathrobium semicaeruleum* Cameron, desig. V. Assing 2011 / Lobrathium semicaeruleum (Cameron), det. V. Assing 2011" (BMNH).

Comment. The original description of *L. semicaeruleum* is based on an unspecified number of syntypes, among them at least one male, from "Gopaldhara, Sikkim ..., West Bhatkot, alt. 4000 feet, and West Almora, Kumaon" (Cameron 1921). A male syntype from Gopaldhara was located in the Cameron collection at the BMNH and designated as the lectotype.

Additional material examined. India: 1♀ [labelled as "Cotype" of *L. semicaeruleum*; identification doubtful], Dehra Dun, 1922, leg. Cameron (MHNG).
Nepal: 4♂♂, 2♀♀ [5 exs. with, 1 without elytral spots; 1 ex. teneral]: Khandbari district, Arun valley at Num main bridge, 1000 m, 21.IV.1984, leg. Smetana & Löbl (cSme, cAss).

Redescription. Body length 6.0–7.2 mm; length of forebody 3.4–3.9 mm. Coloration variable: forebody blackish with distinct bluish hue; abdomen black; elytra with or without large reddish spot occupying posterior 1/3–2/5 of elytra; legs blackish-brown to blackish, with slightly paler tarsi; antennae blackish-brown to black.

Head (Fig. 36) approximately as long as broad; posterior angles broadly rounded, practically obsolete; punctation dense and coarse, median dorsal portion sparsely punctate; interstices without microsculpture. Eyes very large and bulging, distinctly more than half as long as distance from posterior margin of eye to neck.

Pronotum (Fig. 36) approximately 1.25–1.30 times as long as broad and approximately 0.9 times as wide as head, lateral margins distinctly convex in dorsal view; punctation very dense, somewhat coarser than that of head.

Elytra (Fig. 36) conspicuously long, 1.10–1.15 times as long as, and distinctly wider than pronotum; punctation coarse and dense, not arranged in series; interstices without microsculpture. Hind wings present.

Abdomen narrower than elytra; punctation fine and dense; posterior margin of tergite VII with palisade fringe.

♂: posterior margin of tergite VIII weakly convex; sternite VI with small median tubercle; sternite VII with pronounced median tubercle, posterior margin weakly concave; sternite VIII weakly transverse, with long and broad median impression, this impression with numerous modified, short black setae, posterior excision relatively deep and U-shaped (Figs 37–38); aedeagus approximately 1 mm long, with apically bifid ventral process of characteristic shape (Figs 39–40).

Intraspecific variation. The coloration of the elytra is variable. A posterior elytral spot may be present or absent. In one locality in eastern Nepal, both colour morphs were collected together.

Distribution and natural history. Confirmed records of this species are known only from the type locality in North India and one locality in eastern Nepal (Fig. 41). Other previous literature records (Cameron 1921, 1931), as well as the examined female-based record from Uttaranchal must be regarded as doubtful and require confirmation; they may well refer to *L. mordens* or other similar species. The examined material was found at altitudes of 1000 and approximately 1200 m. One specimen collected in April is teneral.

***Lobrathium mordens* sp. n.** (Figs 41–45)

Type material. Holotype ♂: "W. Almora, Kumaon, India. H. G. C. / G.C. Champion coll. B.M. 1927–409 / Holotypus ♂ *Lobrathium mordens* sp. n., det. V. Assing 2012" (BMNH). Paratypes: 2♂♂: "2115 / W. Almora Divn. Kumaon. U.P., Apr, 1918. HGC" (BMNH, cAss); 1 ex.: same data, but "Mar. 1917" (cAss); 1♀ [teneral]: "Ranikhet, Kumaon. H. G. C." (BMNH); 2 exs.: "Ranikhet Div., Kumaon, U.P., Feb. '20, HGC." (BMNH); 2 exs.: "Ranikhet, Kumaon, India. H.G.C." (BMNH); 1 ex.: "West Bhatka [?], Kumaon 4000', Mar '20 HGC" (BMNH); 2 exs.: "India, Haldwani Dist., Kumaon, H.G. Champion" (BMNH); 3 exs.: "Haldwani Div., Kumaon, India. H.G.C." (BMNH, cAss); 1 ex.: "2745 / W. Almora Dn, Almora U.P., Mar. '19. HGC" (cAss); 1 ex.: "Dhelu [= Chauntra], Mandi [Mandi District in Himachal Pradesh], Punjab. 4500ft. H.G.C." (cAss).

Etymology. The specific epithet (Latin, present participle of mordere: to sting) refers to the long and slender ventral process of the aedeagus.

Description. Body length 5.5–7.3 mm; length of forebody: 3.0–3.8 mm. Forebody uniformly black with bluish hue. Other external characters as in *L. semicaeruleum*; reliably distinguished only by the male sexual characters.

♂: sternite VI unmodified; sternite VII with shallow and extensive median impression, pubescence not distinctly modified, posterior margin broadly convex (Fig. 42); sternite VIII weakly oblong, in the middle with relatively narrow, but deep oblong impression, this impression with numerous modified, short and stout black setae, posterior excision broadly and rather deeply U-shaped (Fig. 43); aedeagus 1.2–1.3 mm long, with conspicuously long, slen-

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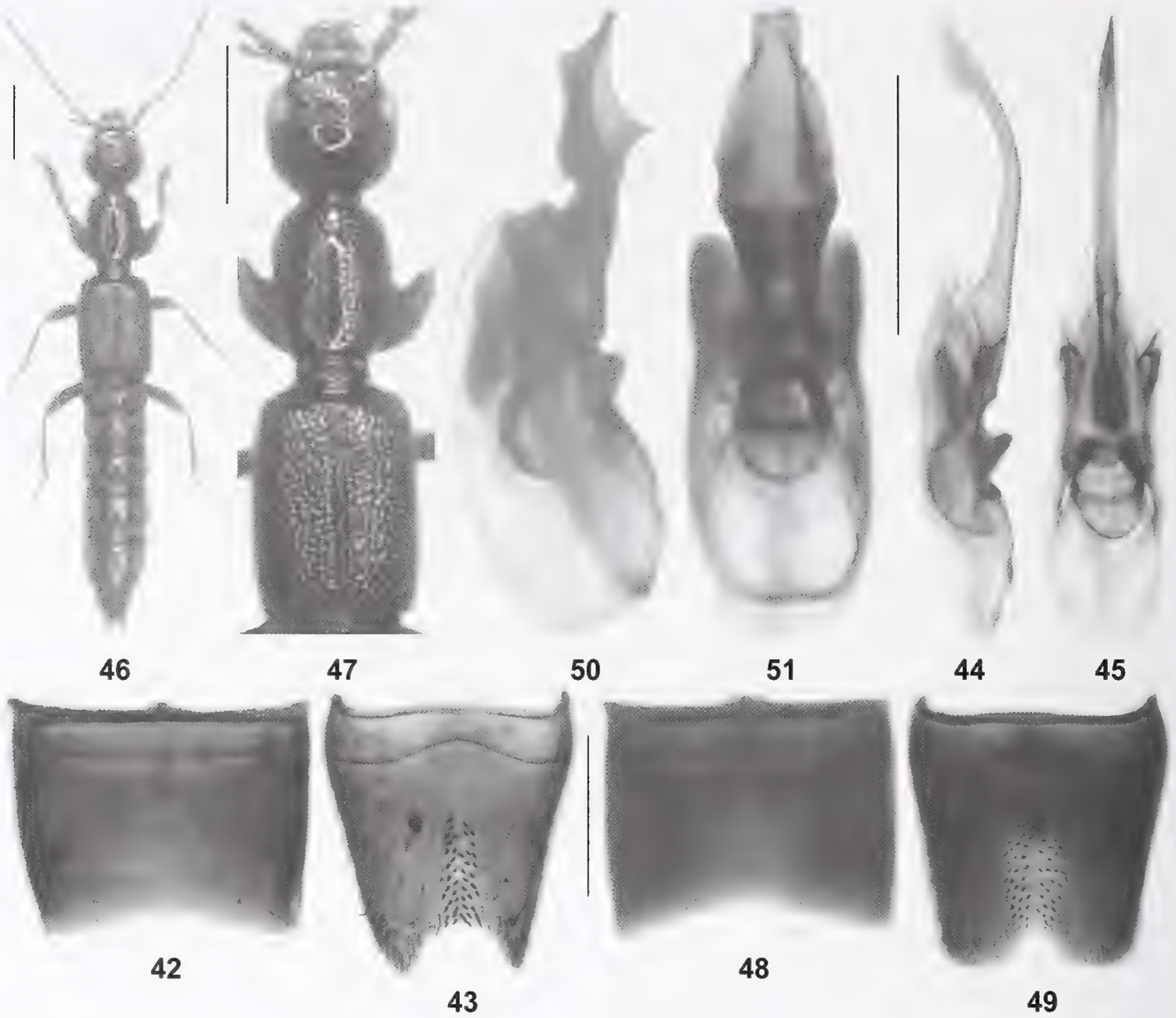

Figs 42–51. *Lobrathium mordens* (**42–45**) and *L. unispinosum* (**46–51**). **42, 48:** male sternite VII; **43, 49:** male sternite VIII; **44–45, 50–51:** aedeagus in lateral and in ventral view; **46:** habitus; **47:** forebody. Scale bars: 46–47: 1.0 mm; 42–45, 48–51: 0.5 mm.

der, and apically dorso-ventrally dilated ventral process (Figs 44–45).

Comparative notes. From other externally similar Himalayan representatives with a uniformly blackish forebody with bluish hue (*L. semicaeruleum*, *L. unispinosum*, *L. integrum*), *L. mordens* is distinguished by the male secondary sexual characters and particularly by the completely different shape of the ventral process of the aedeagus.

Distribution and natural history. *Lobrathium mordens* is currently known from several localities in Uttaranchal and Himachal Pradesh in northern India (Fig. 41). Two specimens were collected at altitudes of approximately 1300–1500 m.

***Lobrathium unispinosum* sp. n.** (Figs 23, 46–51)

Type material. Holotype ♂: "Nepal, 31.10.92, Pokhara-See, leg. J. Schmidt / Holotypus ♂ *Lathrobium unispinosum* sp. n., det. V. Assing 2011" (SDEI). Paratypes: 1♂, 5♀♀: same data as holotype (SDEI, cAss); 1♀: "Nepal, Annapurna, Pokhara Umg. / 800 m, 26.–28.II.1994, leg. Ahrens" (SDEI); 1♀ [without bluish hue]: "Nepal, Annapurna Mts., Landruk-Bhari Kharka, 1650–1900 m, 6.5.1999, leg. C. Krüger, G. Hirthe" (cAss); 1♀: "Ost-Nepal, Rolwaling Himal / Tama Koshi Tal, Suri Dhoban, 1200 m, 14.05.2000, leg. A. Kleeberg" (cKle).

Etymology. The specific epithet (Latin, adjective: with one tooth) refers to the shape of the ventral process of the aedeagus.

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Description. Body length 6.3–7.3 mm; length of forebody 3.4–3.8 mm. Habitus as in Fig. 46. Coloration: forebody blackish, usually with distinct bluish hue; abdomen black; legs blackish-brown to blackish, with slightly paler tarsi; antennae blackish-brown to black.

In external characters highly similar to *L. semicaeruleum* (Figs 46–47), but reliably distinguished by the male sexual characters:

♂: posterior margin of tergite VIII weakly convex; sternite VI without median tubercle; sternite VII with median impression posteriorly, but without tubercles, posterior margin broadly concave (Fig. 48); sternite VIII approximately as long as broad, with long median impression, this impression with numerous modified, short and stout black setae, posterior excision relatively small and concave (Fig. 49); aedeagus 1.2–1.3 mm long, ventral process asymmetric, on right ventral side (ventral view) with pronounced tooth-shaped process, dorsal plate lamellate (Figs 50–51).

Intraspecific variation. One female from the Annapurna lacks the bluish hue and has the forebody black, but other external characters are identical to those of the material from other localities.

Comparative notes. From the externally highly similar *L. semicaeruleum*, this species is reliably distinguished only by the modifications of the male sternites VI–VIII (sternites VI and VII without tubercles, posterior excision of sternite VIII much smaller and less deep), as well as by the larger and differently shaped, asymmetric aedeagus.

Distribution and natural history. *Lobrathium unispinosum* was collected in central Nepal, one female also in eastern Nepal (Fig. 23), at altitudes of 800–1900 m.

***Lobrathium integrum* sp. n.** (Figs 23, 52–57)

Type material. Holotype ♂ [slightly teneral]: "Nepal, Taplejung, Mewa Khola 1570 m, 02.VI.2011, leg. S. Taman, 27°33'13N, 87°36'10E / Collection Naturkundemuseum Erfurt / Holotypus ♂ *Lathrobium integrum* sp. n., det. V. Assing 2011" (NME). Paratypes: 1♂, 8♀♀ [mostly teneral]: same data as holotype (NME, cAss).

Etymology. The specific epithet (Latin, adjective: immaculate, pure) refers to uniform coloration of the elytra.

Description. Body length 6.9–7.9 mm; length of forebody 3.7–4.0 mm. Habitus as in Fig. 52. Coloration: forebody blackish, with distinct bluish hue; abdomen black; legs blackish-brown to blackish, with slightly paler tarsi; antennae blackish-brown to black.

In external characters highly similar to *L. semicaeruleum* and *L. unispinosum* (Figs 52–53), but reliably distinguished by the male sexual characters:

♂: sternite VI unmodified; sternite VII with shallow median impression and with pair of tubercles posteriorly, posterior margin broadly concave (Fig. 54); sternite VIII weakly oblong, with narrow median impression in anterior half, this impression with numerous modified, short and stout black setae, posterior excision conspicuously deep and narrow (Fig. 55); aedeagus 1.4 mm long, ventral process somewhat asymmetric and of distinctive shape, dorsal plate lamellate (Figs 56–57).

Comparative notes. From the externally highly similar *L. semicaeruleum* and *L. unispinosum*, this species is readily distinguished by the shapes and chaetotaxy of the male sternites VII and VIII, as well as by the distinctive shape of the ventral process of the aedeagus.

Distribution and natural history. *Lobrathium integrum* is currently known from only one locality in Taplejung district in the very northeast of Nepal (Fig. 23). The specimens, most of which are somewhat teneral, were collected at an altitude of 1570 m.

***Lobrathium ochreonotatum* (Champion, 1922), revalidated** (Figs 58–61, 66)

Lathrobium semicaeruleum var. *ochreonotatum* Champion, 1922: 34.

Type material examined. Lectotype, present designation: "R. [River] Sarda Gorge, Kumaon, U. P., Dec. 1918, HGC / Lathrobium semicaeruleum Cam. v. ochreonotatum Ch. / 2632 / Brit. Mus. 1922–71. / Syntype / Lectotypus ♂ *Lathrobium ochreonotatum* Champion, desig. V. Assing 2011 / Lobrathium ochreonotatum (Champion), det. V. Assing 2011" (BMNH). Paralectotype: 1♀: "Ranikhet, Kumaon, India, H.G.C. / Lathrobium semicaeruleum Cam. v. ochreonotatum Ch. / Brit. Mus. 1922–71. / Syntype" (BMNH).

Comment. Champion (1922) described *L. ochreonatum* as a variety of *L. semicaeruleum*, stating that it was characterised by "a large ochreous patch at the apex of the elytra", but "differing in no other way from the type". The four type specimens of this variety were apparently collected together with a series of specimens with uniformly coloured elytra. The variety was treated as a synonym of *L. semicaeruleum* by Cameron (1931).

Two syntypes, a male and a female, from the Champion collection at the BMNH were made available for study; the male is designated as the lectotype. An examination of these types, as well as of additional specimens previously identified as *L. semicaeruleum* with red-spotted ely-

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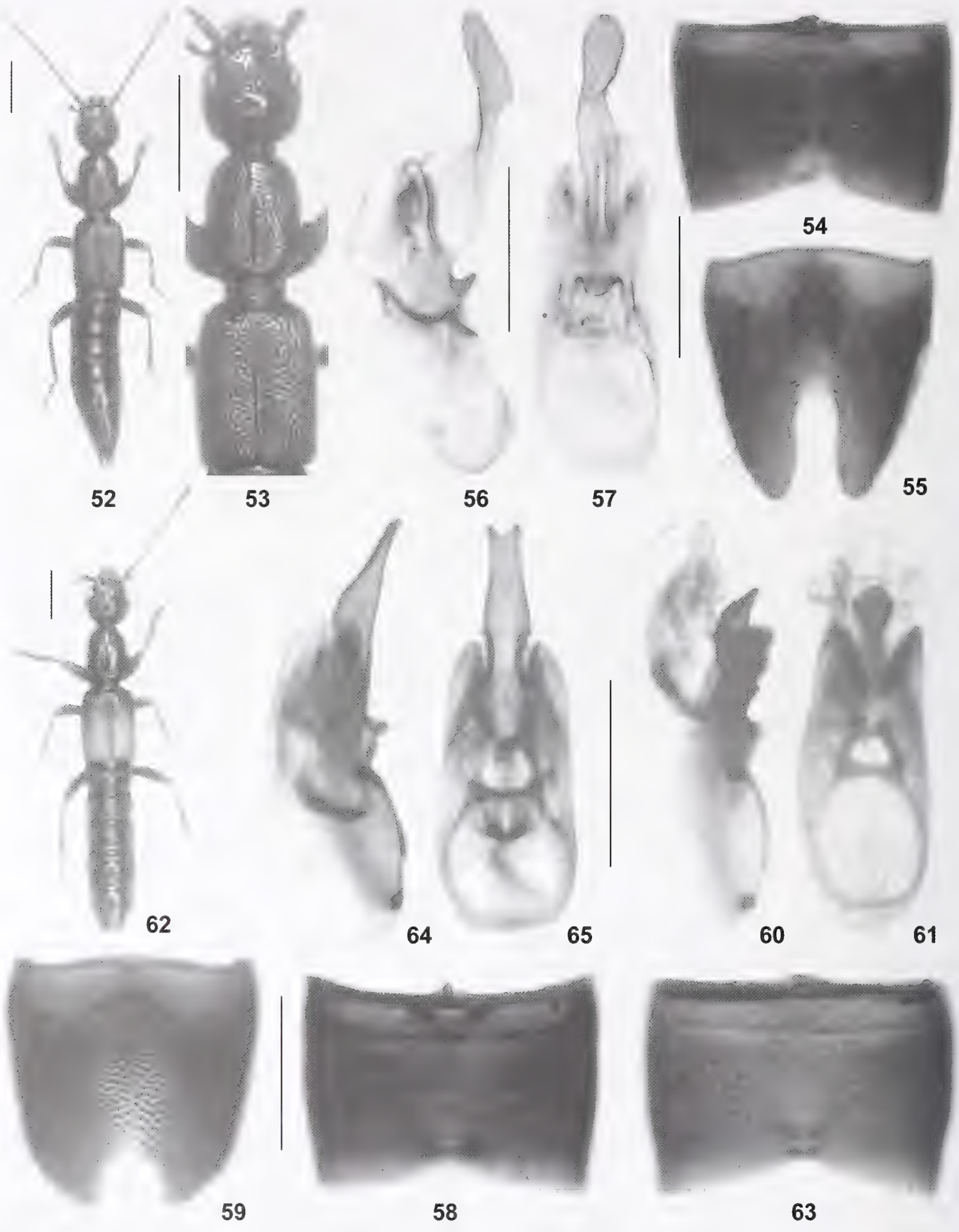

Figs 52–65. *Lobrathium integrum* **(52–57)**, *L. ochreonotatum* **(58–61)**, and *L. flavipenne* **(62–65)**. **52, 62:** habitus; **53:** forebody **54, 58, 63:** male sternite VII; **55, 59:** male sternite VIII; **56–57, 60–61, 64–65:** aedeagus in lateral and in ventral view. Scale bars: 52–53, 62: 1.0 mm; 54–61, 63–65: 0.5 mm.

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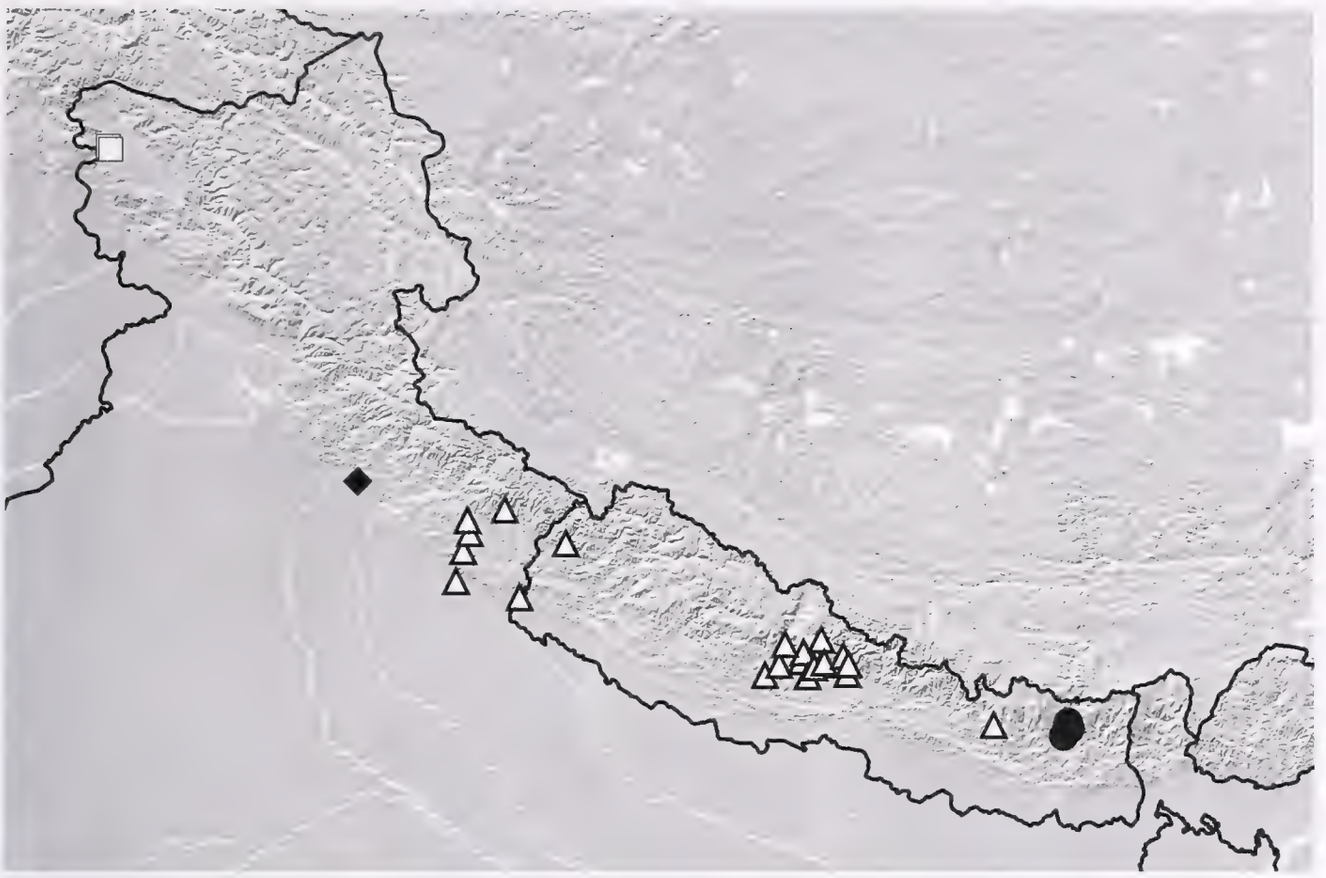

Fig. 66. Distributions of Himalayan *Lobrathium* species, based on revised records: *L. alticola* (open squares); *L. cylindricolle* (filled diamond); *L. ochreonotatum* (open triangles); *L. biaculeatum* (filled circles).

tra revealed that they clearly represent a distinct species, so that the name *L. ochreonotatum* is revalidated.

Additional material examined. Nepal: 1 ex., Annapurna range, Landruk-Bhari Kharka, 1650–1900 m, 6.V.1999, leg. Krüger & Hirthe (cAss); 2 exs., Annapurna, Tadapani-Chomrong, Kyumnu Khola, 1950 m, 4.V.1999, leg. Krüger & Hirthe (cAss); 4 exs., Annapurna, NE Pokhara Sikles, 2000 m, 15.V.1993, leg. Schmidt (cKle, cAss); 3 exs., SW-Manaslu, Bhara Pokhari Lekh, below Taksa, 1500–1700 m, 31.III.1999, leg. Jäger (SNSD, cAss); 3 exs., Manaslu, Marsyangdi Khola, E-side, Bhachok Khola, 1000 m, 13.IV.1999, leg. Hirthe (cAss); 3 exs., Manaslu, Marsyangdi Khola, E-side, above Besi Sahar, 1500 m, 31.III.1999, leg. Hirthe (cAss); 3 exs., Manaslu, Ngadi Khola, 6 km NE Ngadi, 1350 m, 17.V.2005, leg. Schmidt (NME, cAss); 1 ex., Maharkali/Darchula, Latinath, 29°44'N, 80°46'E, 1030 m, stream bank, 31.V.–1.VI.2005, leg. Weigel (NME); 1 ex., Dhaulagiri, Baglung Lekh, above Okhle vill., 2460 m, 13.V.2004, leg. Kleeberg (cAss); 1 ex., Pokhara, southern shore of Phewa lake, 800–900 m, stream bank, sifted, 8.V.2001, leg. Hirthe (cAss); 1 ex., Pokhara lake, 31.X.1992, leg. Schmidt (cAss); 5 exs., Kali-Gandaki river, between Tatopani and Beni, 1000 m, 29.X.1992, leg. Schmidt (SDEI, cAss); 2 exs., W Annapurna, between Lete and Dana, 1400–2400 m, 25.X.1992, leg. Schmidt (SDEI, cAss); 2 exs. [1 teneral], Annapurna, Sikles range, Garlang, 1350 m, 18.IV.1996, leg. Schmidt (SDEI); 1 ex., Annapurna, N Sikles, below Dhara Kharka, 1750 m, 26.IV.1996, leg. Schmidt (cAss); 1 ex., Annapurna, Marsyangdi Khola, Chamje bis valley, 1400–1700 m, 11.VI.1994, leg. Schmidt (SDEI); 1♂ [teneral; without elytral spots], E-Nepal, Ramechap district, Khimti Khola near Shivalaya, 1800 m, 5.V.1997, leg. Schawaller (SMNS). **India: Uttaranchal:** 7 exs., ca. 30 km N Bageshwar, Khati village, 2100–2300 m, 27.–30.VI.2003, leg. Kejval & Trýzna (cSch, cAss); 1♂ [slightly teneral], West Almora Division, Kumaon, VI.1917, leg. Champion (BMNH); 1 ex., Kumaon, Sarda Gorge, XII.1018, leg. Champion (BMNH); 2 exs., Kumaon, West Bhatkat, V.1920, leg. Champion (BMNH, cAss); 2 exs., N Kumaon, Gori R. Gorge, leg. Champion (BMNH, cAss); 2 exs. [1 slightly teneral], Haldwani Division, Kaldhunga, 26.III.1923, leg. Champion (BMNH).

Redescription. External characters as in *L. semicaeruleum*. Elytra usually with, rarely without large bright-reddish spots in the posterior portion of the elytra.

♂: sternite VI unmodified; sternite VII with pair of tubercles posteriorly, posterior margin weakly concave (Fig. 58); sternite VIII weakly transverse, with long and broad median impression, this impression with numerous modified, short and stout black setae, posterior excision relatively deep and broadly U-shaped (Fig. 59); aedeagus approximately 0.9 mm long, ventral process of characteristic shape, apically not bifid (Figs 60–61).

Intraspecific variation. In the male from Ramechap district, the usually large and distinct elytral spots are missing; the elytra are uniformly black with a distinct bluish hue.

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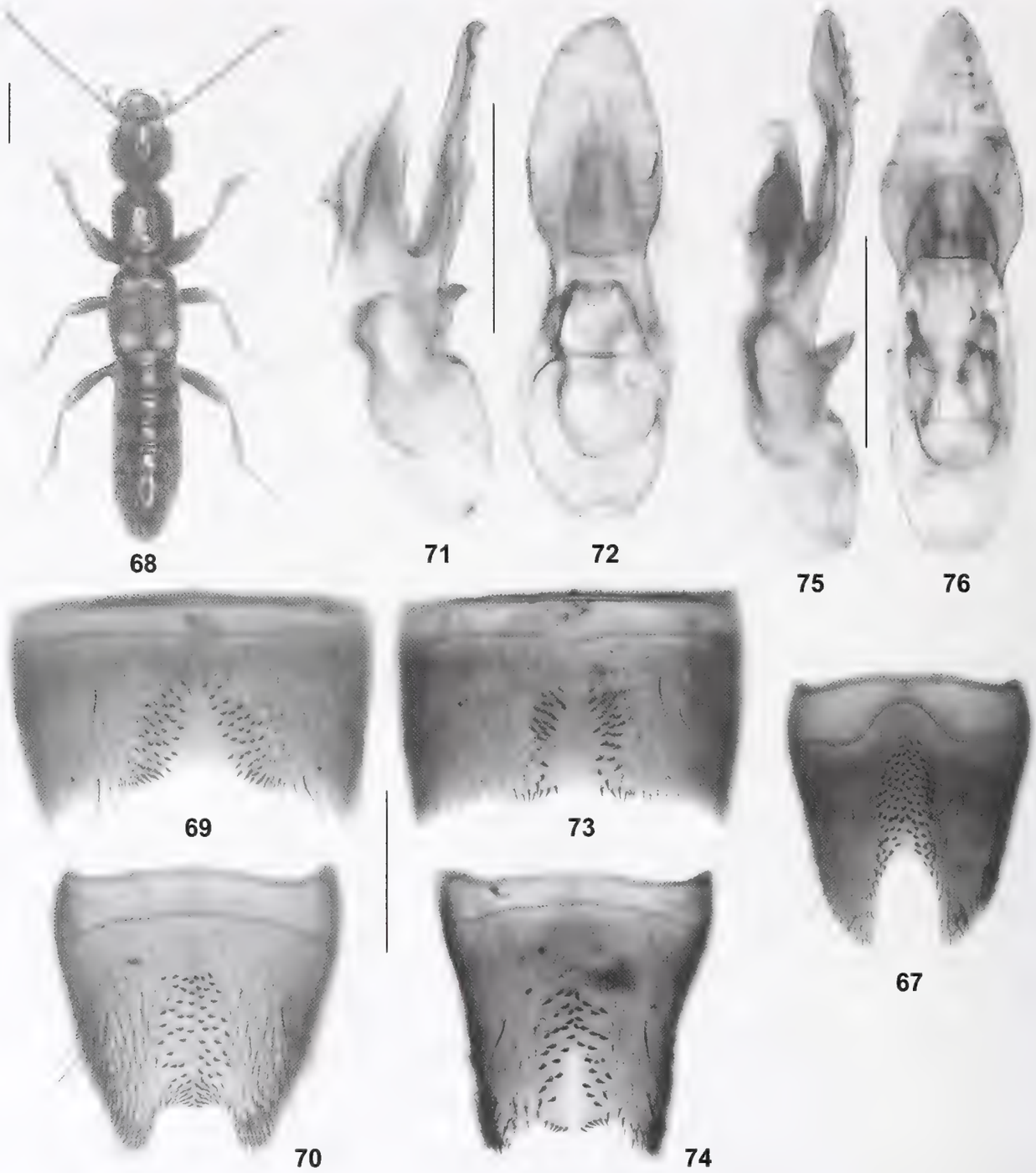

Figs 67–76. *Lobrathium flavipenne* (**67**), *L. kleebergi* (**68–72**), and *L. guttula*, lectotype (**73–76**). **67, 70, 74:** male sternite VIII; **68:** habitus; **69, 73:** male sternite VII; **71–72, 75–76:** aedeagus in lateral and in ventral view. Scale bars: 68: 1.0 mm; 67, 69–76: 0.5 mm.

Comparative notes. As can be inferred from the highly similar external morphology and particularly the similar male primary and secondary sexual characters, *L. ochreonotatum* is closely related to, and probably the adelphotaxon of *L. semicaeruleum*, from which it is readily distinguished by the morphology of the aedeagus. In addition, it is separated by the slightly different modifications of the male sternites VII and VIII.

Distribution and natural history. *Lobrathium ochreonotatum* is apparently widespread in the Himalaya (North India, Nepal) (Fig. 66), where it has been found at altitudes of 800–2460 m, at least on one occasion together with *L. unispinosum*. Teneral specimens were collected during the period from March through June.

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***Lobrathium flavipenne* sp. n.** (Figs 41, 62–65, 67)

Type material. Holotype ♂: "Parbatti V., Kulu. Punjab. 6–8,000 ft. H. G. C. / G.C. Champion coll. B.M. 1927–409 / Holotypus ♂ *Lobrathium flavipenne* sp. n., det. V. Assing 2012" (BMNH).

Etymology. The specific epithet (Latin, adjective: with yellow wings) alludes to the distinctive coloration of the elytra.

Description. Body length 7.4 mm; length of forebody 3.8 mm. Habitus as in Fig. 62. Coloration: head and pronotum blackish with distinct bluish hue; elytra yellowish, with the anterior third infuscate; abdomen blackish; legs and antennae blackish-brown. Other external characters similar to those of *L. semicaeruleum* and *L. ochreonotatum*.

♂: sternite VII with shallow and extensive median impression, near anterior margin with transverse, bi-domed tubercle, posterior margin weakly concave (Fig. 63); sternite VIII weakly oblong, median impression extensive and with numerous modified, stout and short black setae, posterior excision deep and U-shaped (Fig. 67); aedeagus 1.1 mm long, symmetric, and with apically bifid ventral process in ventral view (Figs 64–65).

Comparative notes. This species is readily distinguished from the spotted morphs of *L. semicaeruleum* and *L. ochreonotatum*, as well as from other similar species by the extensively yellowish coloration of the elytra, as well as by the male primary and secondary sexual characters.

Distribution and natural history. The type locality is situated near Kulu in Himachal Pradesh, northern India (Fig. 41), at an altitude of approximately 2000–2600 m.

***Lobrathium kleebergi* sp. n.** (Figs 41, 68–72)

Type material. Holotype ♂: "Nepal, nordöstl. Kathmandu-Tal, 06.05.1993, leg. A. Kleeberg / Holotypus ♂ *Lobrathium kleebergi* sp. n., det. V. Assing 2011" (cAss). Paratypes: 2♂♂: same data as holotype (cKle, cAss); 1♂ [slightly teneral]: "Nepal-Himalaya, Annapurna Mts., Pokhara-See, Flußmündung, 850 m, 10.5.1993, leg. Schmidt" (cKle); 1♂ [slightly teneral]: "Nepal, Tama Koshi Vall., Suri Doban, 1100–1300 m, 04.06.2000, leg. J. Schmidt" (cKle); 1♂: "Nepal Manaslu Mts., Bara Pokhari Leak [sic] above Bhachok Goan vill., 1600–1800 m, leg. J. Schmidt, 29.IV.2005, 28°14'28N 84°24'32E" (NME).

Etymology. This species is dedicated to Andreas Kleeberg, who collected most of the type specimens.

Description. Body length 6.6–8.0 mm; length of forebody 4.0–4.6 mm. Habitus as in Fig. 68. Coloration: body blackish, elytra with relatively small subcircular yellowish spot, this spot reaching neither suture, nor lateral margin, nor posterior margin; legs reddish brown with reddish tarsi, femora sometimes infuscate; antennae reddish.

Head approximately as long as broad; posterior angles broadly rounded, weakly marked; punctation coarse and conspicuously dense, interstices reduced to narrow ridges, median dorsal portion and frons sparsely punctate or impunctate; interstices without microsculpture. Eyes moderately large, approximately half as long as distance from posterior margin of eye to neck.

Pronotum 1.15–1.20 times as long as broad and 0.90–0.95 times as wide as head, lateral margins almost straight and weakly converging in dorsal view; punctation moderately dense, distinctly less dense than that of head.

Elytra of variable length, 0.9–1.1 times as long as, and somewhat wider than pronotum; punctation coarse and dense, not arranged in distinct series; interstices without microsculpture. Hind wings apparently present.

Abdomen narrower than elytra; punctation fine and dense; posterior margin of tergite VII with palisade fringe.

♂: posterior margin of tergite VIII strongly convex; sternite VI unmodified; sternite VII strongly transverse and with median impression posteriorly, this impression with pair of clusters of numerous modified, stout and short black setae, posterior margin broadly and rather deeply concave (Fig. 69); sternite VIII weakly transverse, with broad and deep median impression, this impression with numerous modified, stout and short black setae, posterior excision rather broad and of subtrapezoid shape, in the middle with short acute process, on either side of excision with dense blackish pubescence (Fig. 70); aedeagus approximately 1.1 mm long, with large blade-shaped ventral process (Figs 71–72).

Comparative notes. This species is characterised particularly by the male sexual characters. It is readily distinguished from *L. ochreonotatum* by external characters alone: much larger and broader body with a less slender pronotum, extremely dense punctation of the head, absence of a bluish hue on the forebody, smaller elytral spot.

Distribution and natural history. *Lobrathium kleebergi* is currently known only from several localities in Nepal (Fig. 41). Some of the type specimens were collected at altitudes between 850 and approximately1700 m. The specimens from the type locality were floated from the bank of a stream (Kleeberg, pers. comm.).

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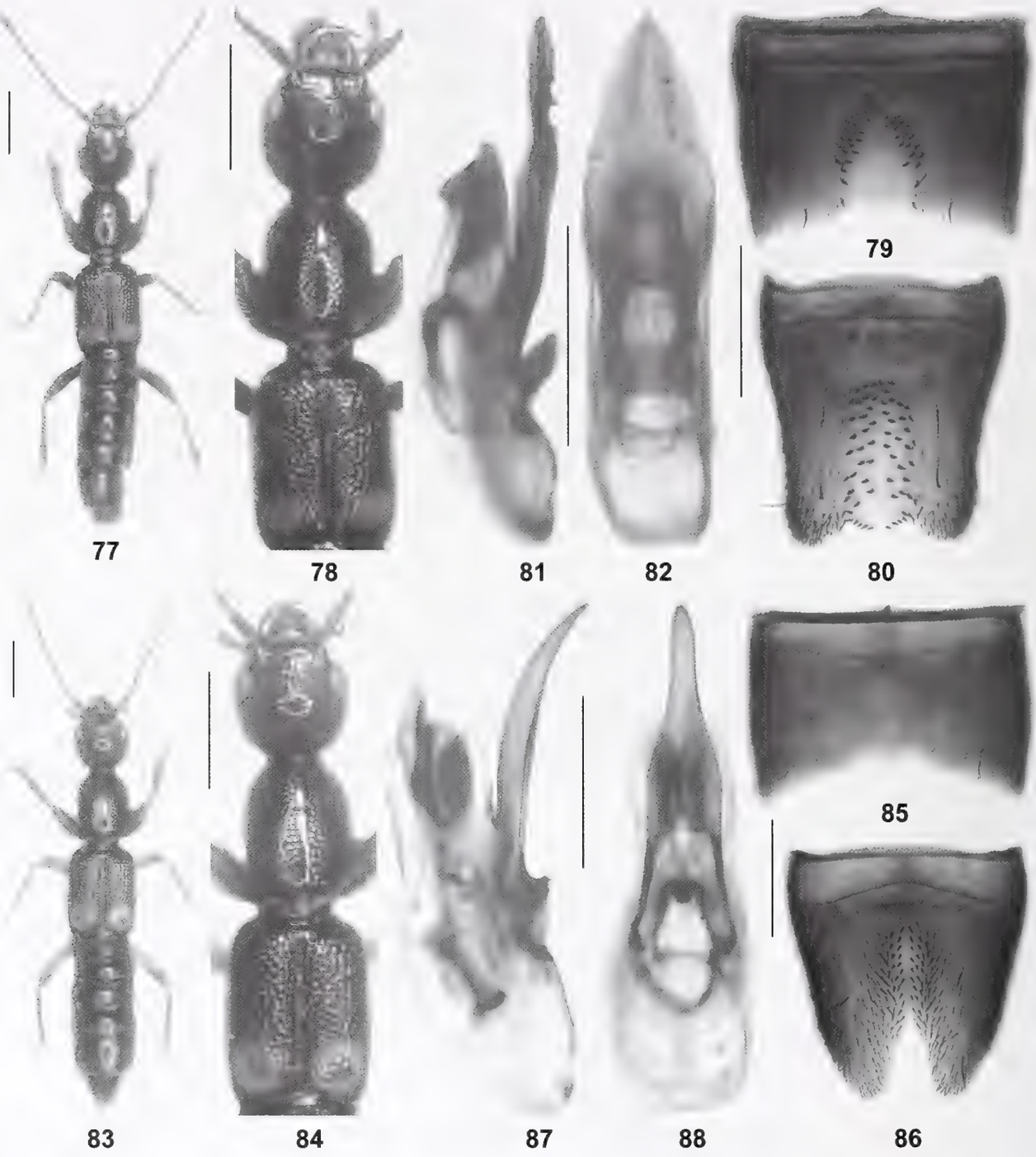

Figs 77–88. *Lobrathium sinuatum* (**77–82**) and *L. pustulatum*, lectotype (**83–88**). **77, 83:** habitus; **78, 84:** forebody; **79, 85:** male sternite VII; **80, 86:** male sternite VIII; **81–82, 87–88:** aedeagus in lateral and in ventral view. Scale bars: 77–78, 83–84: 1.0 mm; 79–82, 85–88: 0.5 mm.

***Lobrathium guttula* (Fauvel, 1895), comb. n.** (Figs 73–76, 140)
Lathrobium guttula Fauvel, 1895: 234 f.

Type material examined. Lectotype ♂, present designation: "Carin, Asciuii Ghecù [near Loi-kaw; approx. 19°41'N, 97°15'E], 1400–1500 m, L. Fea. III–IV.88. / Coll. R. I. Sc. N. B. / Ex-Typis / Lectotypus ♂ *Lathrobium guttula* Fauvel, desig. V. Assing 2011 / Lobrathium guttula (Fauvel), det. V. Assing 2011" (IRSNB). Paralectotypes: 1♀: same data as lectotype; 1♀: "Darjeeling / guttula Fvl. / Coll. R. I. Sc. N. B. / Ex-Typis" (IRSNB).

Comment. The original description is based on an unspecified number of syntypes, among them at least one male, from "Birmanie, Carina Asciuii Ghécu, 1400–1500 m,

Fig. 89. Distributions of Himalayan *Lobrathium* species, based on revised records: *L. bicarinatum* (open square); *L. sinuatum* (filled triangle); *L. kosiense* (open circle); *L. pustulatum* (open diamond).

III–IV (L. Fea). Sikkim, Darjeeling (Christie)" (Fauvel 1895). Three syntypes, a male and two females, were located in the collections of the IRSNB; the slightly teneral male is designated as the lectotype. It is currently unclear whether or not the female syntype from Darjeeling is conspecific with the lectotype; the possibility that it refers to *L. kleebergi* or to an undescribed species cannot be ruled out. Although Fauvel (1895) had placed *L. guttula* near *L. multipunctum*, it had previously been listed as *Lathrobium* even in recent catalogues (Smetana 2004). The species clearly belongs to *Lobrathium*.

Redescription. External characters as in *L. kleebergi* (see preceding section). Distinguished only by the male sexual characters:

♂: sternite VI unmodified; sternite VII strongly transverse and with pronounced median impression, this impression impunctate in the middle and laterally with a pair of clusters of numerous modified, stout and short black setae, posterior margin broadly and weakly concave (Fig. 73); sternite VIII as long as broad, with broad and deep median impression, this impression with numerous modified, stout and short black setae, posterior excision rather broad and shallow, in the middle triangularly produced and with row of five short, black marginal setae on either side (Fig. 74); aedeagus 1.3 mm long and with blade-shaped ventral process (Figs 75–76).

Comparative notes. As can be inferred from the similar external (large head with extremely dense punctation and large impunctate patches) and from the similar male sexual characters, *L. guttula* is a close relative of *L. kleebergi*. It is distinguished from the latter by the shape and chaetotaxy of the male sternites VII and VIII, as well as by the different shape of the ventral process of the aedeagus. For characters separating it from *L. sinuatum*, its presumable sister species, see the following section.

Distribution and natural history. *Lobrathium guttula* was originally described from Myanmar and Darjeeling (North India: West Bengal). Cameron subsequently reported it from Siwaliks in Uttaranchal. In the Palaearctic Catalogue (Smetana 2004), it is also listed for Himachal Pradesh and the Oriental region. In view of the external similarity of *Lobrathium* species and the fact that the male sexual characters of the type material were previously unknown, all records, except those from the type locality, which is situated in Kaya State close to the town Loi-kaw (Fig. 140), should be considered doubtful and require confirmation.

Two of the type specimens were collected at an altitude of 1400–1500 m during spring (March/April). The lectotype is slightly teneral.

***Lobrathium sinuatum* sp. n.** (Figs 77–82, 89)

Type material. Holotype ♂: "Nepal, 31.10.92, Pokhara-See, leg. J. Schmidt / Holotypus ♂ *Lobrathium sinuatum* sp. n., det. V. Assing 2011" (SDEI).

Etymology. The specific epithet (Latin, adjective) alludes to the bisinuate posterior margin of the male sternite VIII.

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Description. Body length 7.2 mm; length of forebody 4.1 mm. Habitus as in Fig. 77. Coloration: body blackish, elytra with relatively small subcircular yellowish spot, this spot reaching neither suture nor lateral or posterior margins; legs blackish with reddish tarsi; antennae dark-brown.

Head (Fig. 78) 1.05 times as long as broad; lateral margins behind eyes convexly rounded towards neck, posterior angles obsolete; punctation moderately coarse and very dense, interstices reduced to narrow ridges, transverse patch in median dorsal portion and frons impunctate; interstices without microsculpture. Eyes moderately large, approximately half as long as distance from posterior margin of eye to neck.

Pronotum (Fig. 78) 1.22 times as long as broad and 0.9 times as wide as head, lateral margins almost straight and weakly converging in dorsal view; punctation moderately dense, distinctly less dense and somewhat coarser than that of head.

Elytra (Fig. 78) nearly 1.1 times as long as, and distinctly wider than pronotum; punctation coarse and dense, arranged in very irregular series; interstices without microsculpture. Hind wings apparently present.

Abdomen narrower than elytra; punctation fine and dense; posterior margin of tergite VII with palisade fringe.

♂: posterior margin of tergite VIII weakly convex; sternite VI unmodified; sternite VII moderately transverse and with median impression posteriorly, this impression delimited by approximately 20 modified, stout and short black setae on either side, posterior margin broadly and weakly concave (Fig. 79); sternite VIII oblong, with broad median impression, this impression with numerous modified, stout and short black setae, posterior excision shallow and bisinuate (Fig. 80); aedeagus approximately 1.2 mm long, with large blade-shaped ventral process (Figs 81–82).

Comparative notes. *Lobrathium sinuatum* is characterised particularly by the conspicuous shape and chaetotaxy of the male sternite VIII, as well as by the shape and chaetotaxy of the male sternite VII and the morphology of the aedeagus. It is additionally separated from the similar and geographically close *L. kleebergi* by the darker legs and antennae, as well as by the more slender pronotum. Based on the similarly derived male sexual characters (shapes and chaetotaxy of the male sternites VII and VIII; morphology of the aedeagus), *L. sinuatum* is the adelphotaxon of *L. guttula*, from which it is separated by the slightly different shape of the ventral process of the aedeagus (both in lateral and in ventral view), the different shape of the dorso-apical portion of the aedeagus in lateral view, the slightly different chaetotaxy of the less transverse male sternite VII, as well as by the slightly different shape and chaetotaxy of the male sternite VIII.

Distribution and natural history. The type locality is situated near Pokhara in central Nepal (Fig. 89), where the holotype was collected together with *L. unispinosum*.

Lobrathium pustulatum (Cameron, 1931), comb. n.

(Figs 83–89)

Lathrobium pustulatum Cameron, 1931: 202.

Type material examined. Lectotype ♂ [somewhat damaged, four legs missing, antennae broken], present designation: "Naga Hills, Assam (8) / L. pustulatum / M. Cameron. Bequest. B.M. 1955–147. / Syntype / Syntype Lathrobium pustulatum Cameron, 1931, det. R.G. Booth 2011 / Lectotypus ♂ *Lathrobium pustulatum* Cameron, desig. V. Assing 2012 / Lobrathium pustulatum (Cameron), det. V. Assing 2012" (BMNH). Paralectotype ♀: same data as lectotype (BMNH).

Comment. The original description is based on an unspecified number of syntypes, among them at least one male, from "Assam: Naga Hills, alt. 9000 feet" collected by "S. N. Chatterjee" (Cameron 1931). Two syntypes, a male and a female, were located in the collections of the BMNH. The somewhat damaged male is designated as the lectotype. The species undoubtedly belongs to *Lobrathium*.

Redescription. Body length 7.0–7.5 mm; length of forebody 4.0–4.2 mm. Habitus as in Fig. 83. Coloration: body blackish, elytra with a relatively large yellowish spot not reaching posterior and lateral margins; legs yellowish with the apices of the femora and the tibiae infuscate; antennae brown to dark-brown with darker antennomere I.

Head (Fig. 84) approximately as long as broad, widest accross eyes, convexly narrowed posteriad behind eyes; posterior angles broadly rounded, weakly marked; punctation coarse and dense, interstices reduced to narrow ridges in posterior and lateral dorsal portions, median dorsal portion and frons more sparsely punctate; interstices without microsculpture. Eyes large and strongly convex, distinctly more than half as long as distance from posterior margin of eye to neck.

Pronotum (Fig. 84) 1.25–1.30 times as long as broad and 0.90–0.95 times as wide as head, lateral margins weakly convex in dorsal view; punctation moderately dense, distinctly less dense than that of head; impunctate midline distinct and of moderate breadth.

Elytra (Fig. 84) long and broad, approximately 1.05 times as long as, and much wider than pronotum; punctation coarse and dense, partly obliquely confluent, and partly arranged in irregular and distinctly oblique series; interstices without microsculpture. Hind wings present and apparently fully developed.

Abdomen narrower than elytra; punctation moderately fine and dense, shallower on posterior than on anterior ter-

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gites; microsculpture shallow on anterior tergites, distinct on tergite VII; posterior margin of tergite VII with palisade fringe.

♂: posterior margin of tergite VIII convex; sternites V and VI with shallow impression posteriorly; sternite VII strongly transverse and with pronounced median impression posteriorly, this impression without pubescence in the middle and semitransparent posteriorly, posterior margin broadly and rather strongly concave (Fig. 85); sternite VIII as long as broad, with deep and relatively narrow median impression, this impression with numerous modified, stout and short black setae, posterior excision deep and narrow (Fig. 86); aedeagus 1.5 mm long and with ventral process of characteristic shape (Figs 87–88).

♀: posterior margin of tergite VIII pointed, almost of triangular shape.

Comparative notes. *Lobrathium pustulatum* is distinguished from the similarly coloured *L. kleebergi* particularly by the coloration of the legs, the shape of the head, the larger and more bulging eyes, the partly confluent punctation of the elytra, the shape and chaetotaxy of the male sternites VII and VIII, and by the completely different morphology of the aedeagus.

Distribution and natural history. *Lobrathium pustulatum* has become known only from the type locality in Assam, northeastern India (Fig. 89), where the type specimens were collected at an altitude of about 2750 m.

***Lobrathium wittmeri* Coiffait, 1982** (Figs 41, 90–95)
Lobrathium wittmeri Coiffait, 1982b: 283.

Type material examined. Holotype ♂: "Phulchoki 2600 m, 11.–14.6. / Nepal, W. Wittmer, C. Baroni U. 1976 / Holotype / Lobrathium wittmeri H. Coiffait 1982 / Lobrathium wittmeri Coiffait, det. V. Assing 2011" (NHMB).

Comment. The original description of *L. wittmeri* is based on a single male holotype and a female paratype from "Népal, Phulchoki, 2600 m" (Coiffait 1982b). The holotype is deposited in the collections of the NHMB.

Additional material examined. Nepal: 13 exs. [micropterous], Dhaulagiri range, Baglung Lekh, ca. 30 km W Baglung, northern Tara Khola, 2800 m, 20.V.2004, leg. Kleeberg (cKle, cAss); 1 ex. [micropterous], same data, but 2700–2900 m (cKle); 7 exs. [6 exs. micropterous, 1♀ macropterous], same data, but upper Tara Khola, 2600 m, 18.V.2004 (cKle, cAss); 1♀ [micropterous], Annapurna, Marsyangdi valley, Bagarchhap, 2100 m, 4.V.2007, leg. Schmidt (NME); 6 exs. [micropterous], Annapurna, Sikles range, Nyauli Kharka, S Sikles, 2400 m, 21.–24.IV.1996, leg. Schmidt (SDEI, cAss); 1♀ [micropterous], Manaslu, Barapokhari Lekh, Lake Barapokhara env., 12 km NE Besisahar village, 28°18'N, 84°28'E, 3100 m, 10.IX.2000, leg. Hetzel (cFel); 1♂, Annapurna Himal, Sikles range, 1400–2100 m, V.1996, leg. J. Schmidt (NME).

Redescription. Body length 6–7 mm; length of forebody 3.0–3.5 mm. Coloration: body blackish; legs dark-brown to blackish-brown with reddish tarsi; antennae dark-brown, with antennomere I usually even darker and with the apical antennomeres usually reddish.

Head (Figs 90–91) approximately as long as broad, occasionally weakly transverse or weakly oblong; posterior angles broadly rounded; punctation dense and moderately coarse, median dorsal portion more sparsely punctate; interstices without microsculpture. Eyes rather large, approximately half as long as distance from posterior margin of eye to neck, or slightly larger.

Pronotum (Figs 90–91) approximately 1.25 times as long as broad and approximately 0.95 as wide as head, lateral margins weakly convex in dorsal view; punctation similar to that of head, but less dense.

Elytra dimorphic, in micropterous morph short (but see comment below), 0.70–0.75 times as long and approximately as wide as pronotum (Fig. 90), or nearly so, in macropterous morph 1.05 times as long as, and much broader than pronotum (Fig. 91); humeral angles marked (macropterous morph) or weakly marked (micropterous morph); punctation coarse, moderately dense, and not arranged in series; interstices without microsculpture and glossy. Hind wings reduced (micropterous morph) or fully developed (macropterous morph).

Abdomen broader than elytra; punctation fine and dense; posterior margin of tergite VII with palisade fringe; tergite VIII without sexual dimorphism, posterior margin weakly convex in both sexes.

♂: sternite VII with median impression posteriorly, on either side of this impression with sparse, weakly modified, somewhat darker and longer setae, posterior margin broadly and distinctly concave (Fig. 92); sternite VIII transverse, with broad median impression, this impression with approximately 30–40 modified, stout and short black setae, posterior excision broad and rather shallow, on either side of this excision with tuft of long black setae (Fig. 93); aedeagus approximately 1 mm long or nearly so; ventral process blade-shaped, slender and apically acute in lateral view; apex of acutely triangular shape in ventral view (Figs 94–95).

Comparative notes. *Lobrathium wittmeri* belongs to a group of species distributed from Nepal to Sichuan and Yunnan, represented in the Himalaya by *L. wittmeri* and *L. kosiense*, and characterised as follows: body small or of moderate size; coloration more or less uniformly blackish, elytral spots absent; elytra and hind wings reduced or dimorphic; eyes mostly of reduced size; sternite VII moderately transverse, relatively weakly modified, without distinctly modified setae; sternite VIII with small posterior excision, on either side of this excision with tuft of black setae; aedeagus symmetric and with more or less blade-shaped ventral process. The Chinese representatives of this

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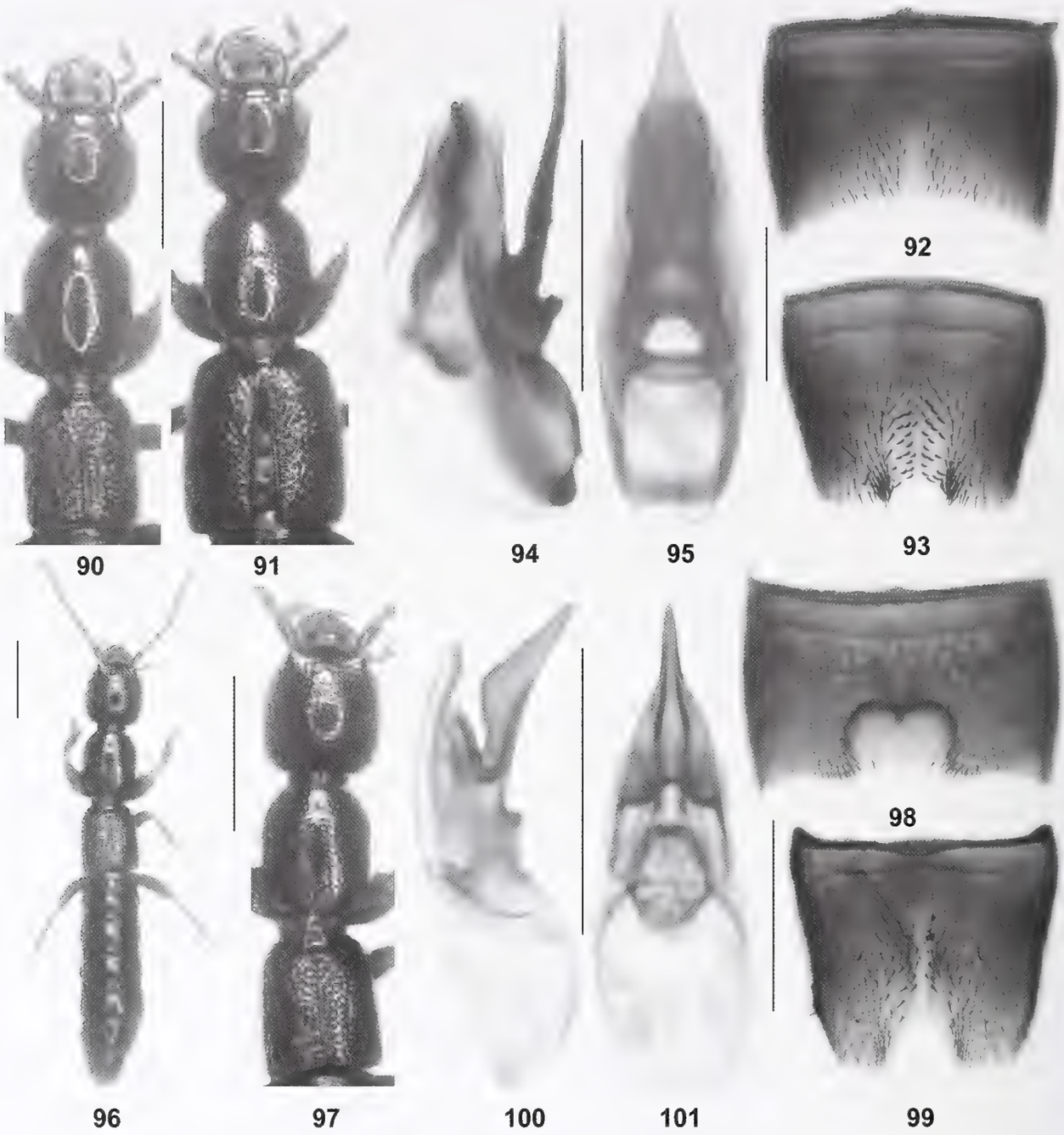

Figs 90–101. *Lobrathium wittmeri* (**90–95**) and *L. alticola* (holotype of *L. pirpanjalense*) (**96–101**). **90–91, 97:** forebody (**91**: macropterous female); **92, 98:** male sternite VII; **93, 99:** male sternite VIII; **94–95, 100–101:** aedeagus in lateral and in ventral view; **96:** habitus. Scale bars: 90–91, 96–97: 1.0 mm; 92–95, 98–101: 0.5 mm.

group are *L. cholaicum*, *L. daxuense*, *L. domenoides*, *L. bimembre*, *L. lamellatum*, and *L. duplex*.

Distribution and natural history. The known distribution of *L. wittmeri* is confined to central Nepal (Fig. 41), where it was found at altitudes of 2100–3100 m. However, since the species is wing-dimorphic it may be widespread in the Himalaya. The specimens from Baglung were scraped from crevices in a vertical loamy wall (Kleeberg, pers. comm.).

***Lobrathium alticola* (Cameron, 1921)** (Figs 66, 96–101)
Lathrobium (*Lobrathium*) *alticola* Cameron, 1943: 36.
Lobrathium pirpanjalensis [sic] Coiffait, 1982a: 87 f.; **syn. n.**

Type material examined. *L. alticola*: Holotype ♀: "Kashmir, Gulmarg, vi–vii–31, Dr. Cameron / L. alticola Cam. Type / Type / M.Cameron. Bequest. B.M. 1955–147. / Holotypus ♀ Lathrobium alticola Cameron, rev. V. Assing 2011 / Lobrathium alticola (Cameron), det. V. Assing 2011" (BMNH).

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L. pirpanjalense: Holotype ♂: "India: Kashmir: Tangmarg, Pir Panjal Gebirge, 2600 m, 21.–25.V.1976, Martens & Schawaller leg. / Type / Holotypus / Lobrathium pirpanjalensis H. Coiffait 1979 / Senckenberg-Museum Frankfurt/Main / Lobrathium alticola (Cameron), det. V. Assing 2012" (SF).

Comment. The original description of *L. alticola* is based on a unique female holotype from "Kashmir: Gulmarg, altitude 8000–10,000 feet" (Cameron 1943).

Lobrathium pirpanjalense was described from a single male holotype collected in "Inde, Cachemire, Tangmarg, Pir Panjal Gebirge" (Coiffait 1982a) without any reference to *L. alticola*, although the type localities of both names are separated by a distance of less than 10 km. A comparison with the holotype of *L. alticola* yielded no differences whatsoever suggesting that *L. pirpanjalense* should represent a distinct species. Hence the synonymy proposed above.

Redescription. Body length 5.1–5.8 mm; length of forebody 2.9 mm. Habitus as in Fig. 96. Coloration: body blackish; legs, except for the paler tarsi and antennae brown to dark-brown; maxillary palpi dark-yellowish.

Head (Fig. 97) approximately 1.05 times as long as broad; posterior angles abruptly rounded, almost marked; punctation dense and coarse, median dorsal portion somewhat less densely punctate; interstices without microsculpture. Eyes small, approximately 1/4 the length of postocular region in dorsal view.

Pronotum (Fig. 97) approximately 1.2 times as long as broad and 0.92–0.94 times as wide as head, lateral margins weakly convex in dorsal view; punctation slightly less coarse and somewhat less dense than that of head.

Elytra short, 0.75 times as long as, and only slightly wider than pronotum, humeral angles weakly marked (Fig. 97); punctation moderately coarse and dense, not arranged in series; interstices without microsculpture. Hind wings reduced.

Abdomen slightly broader than elytra; punctation distinct, moderately coarse, and moderately dense; posterior margin of tergite VII without palisade fringe.

♂: posterior margin of tergite VIII convexly produced in the middle; sternite VI with shallow median impression posteriorly; sternite VII strongly transverse, with pronounced median impression posteriorly, this impression without pubescence, except for two isolated posterior setae, but margined by dense black setae, anteriorly with short process (Fig. 98); sternite VIII moderately transverse, with pronounced median impression posteriorly, this impression with moderately modified setae, posterior excision moderately deep and moderately broad (Fig. 99); aedeagus 0.85 mm long, with dorsally angled (lateral view) and apically acute ventral process (Figs 100–101).

♀: posterior margin of tergite VIII produced, obtusely angled in the middle.

Distribution and natural history. This species is currently known only from Kashmir (Fig. 66). The specimens were collected at altitudes of 2600 and approximately 3000 m.

***Lobrathium kosiense* sp. n.** (Figs 89, 102–107)

Type material. Holotype ♂ [slightly teneral]: "E. Nepal: Kosi, Val. Induwa Kola [sic], 2850 m, 15.IV.84, Löbl – Smetana / Holotypus ♂ *Lobrathium kosiense* sp. n., det. V. Assing 2011" (MHNG).

Etymology. The specific epithet (adjective) is derived from the name of the region where the type locality is situated.

Description. Body length 7.2 mm; length of forebody 3.5 mm. Habitus as in Fig. 102. Coloration (note that the holotype is slightly teneral; the coloration of mature specimens may be darker): head, pronotum, and abdomen blackish-brown; elytra dark-brown; legs reddish-brown with paler tarsi; antennae dark-brown.

Head (Fig. 103) almost as broad as long; lateral margins behind eyes convexly rounded towards neck in dorsal view, posterior angles not marked; punctation coarse and very dense, interstices reduced to narrow ridges; small patches on median dorsal surface and on frons with sparse punctation or impunctate. Eyes large, more than half as long a distance from posterior margin of eye to neck in dorsal view. Antenna moderately slender, approximately 2.3 mm long.

Pronotum (Fig. 103) approximately 1.25 times as long as broad and nearly as wide as head, convexly tapering posteriad in posterior half; punctation dense and coarse; interstices without microsculpture and glossy, distinctly narrower than diameter of punctures.

Elytra (Fig. 103) short, 0.77 times as long as pronotum; humeral angles weakly marked; punctation very coarse and dense. Hind wings completely reduced.

Abdomen broader than elytra; punctation dense and not particularly fine on tergites III–VI, somewhat finer and less dense on tergite VII; interstices with distinct microsculpture; posterior margin of tergite VII without palisade fringe.

♂: posterior margin of tergite VIII indistinctly angled in the middle; sternite VII strongly transverse and with relatively shallow median impression of triangular shape posteriorly, this impression with weakly modified black setae (Fig. 104); sternite VIII moderately transverse, with pronounced median impression posteriorly, this impres-

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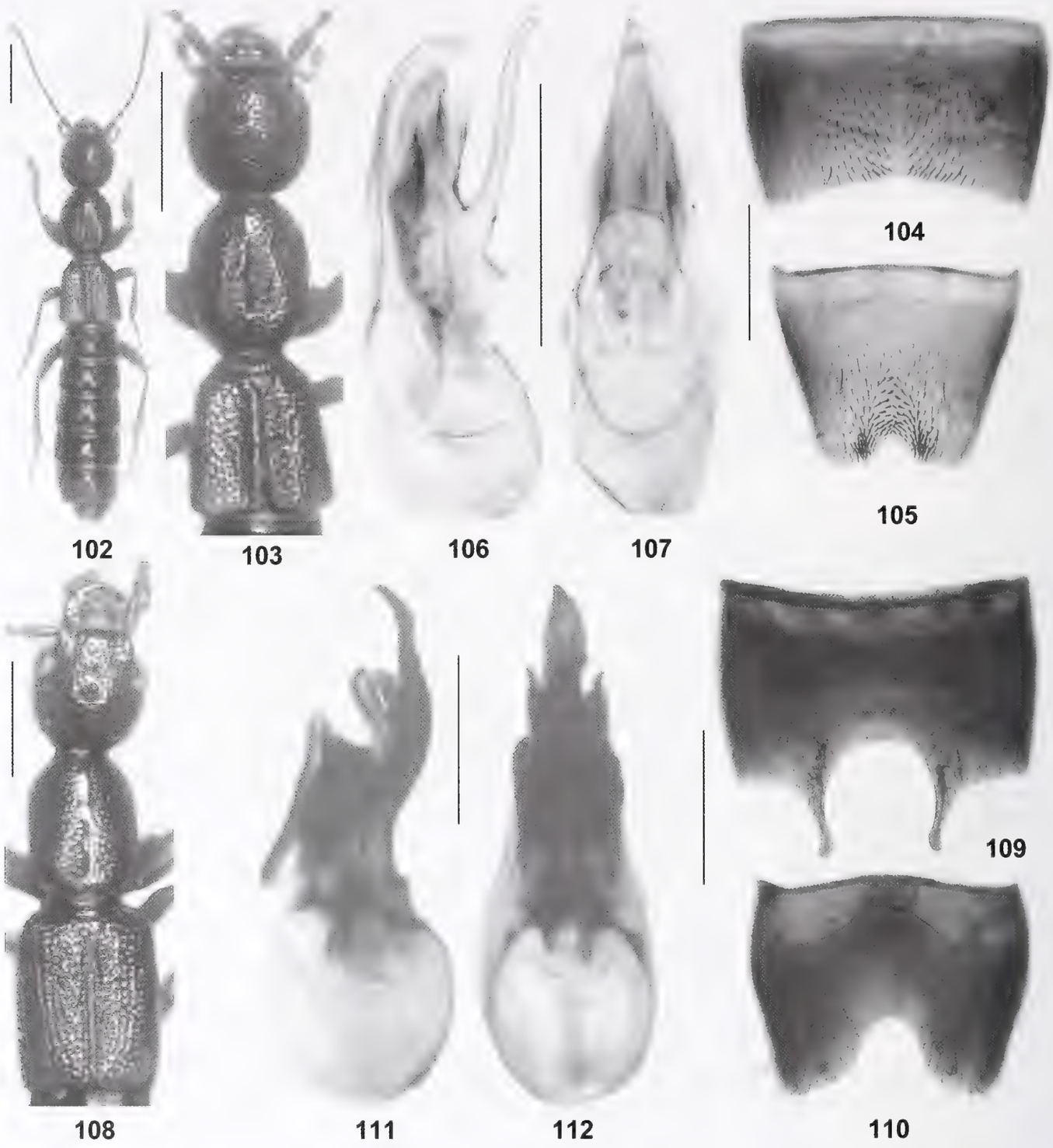

Figs 102–112. *Lobrathium kosiense* (**102–107**), *L. triste* (syntype of *L. kashmiricum*) (**108**), and *L. biaculeatum* (**109–112**). **102:** habitus; **103, 108:** forebody; **104, 109:** male sternite VII; **105, 110:** male sternite VIII; **106–107, 111–112:** aedeagus in lateral and in ventral view. Scale bars: 102–103, 108: 1.0 mm; 104–107, 109–112: 0.5 mm.

sion with numerous distinctly modified, short and black setae, posterior excision relatively small and convex anteriorly, on either side of this excision with cluster of dense black setae (Fig. 105); aedeagus approximately 0.95 mm long, with relatively simple, blade-shaped ventral process (Figs 106–107).

Comparative notes. Based on the modifications of the male sternites VII and VIII, as well as on the similar morphology of the aedeagus, *L. kosiense* appears to be closely related to *L. wittmeri*, from which it is distinguished particularly by slightly smaller size, paler coloration of the legs, distinctly coarser punctation of the head and prono-

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tum, slightly larger eyes, a male sternite VIII with a narrower posterior excision and more numerous modified setae, and by the smaller aedeagus with a ventral process of different shape. For additional remarks on species group affiliations see the comparative notes in the section on *L. wittmeri*.

Distribution and natural history. The type locality is situated in the Induwa Khola, to the east of Num, Kosi, eastern Nepal (Fig. 89). The slightly teneral holotype was collected at an altitude of 2850 m.

Lobrathium biaculeatum sp. n. (Figs 66, 109–112)

Type material. Holotype ♂: "Nepal Khandbari Distr. Pass NE Mangmaya 2300 m 6.IV.84, Smetana & Löbl / Holotypus ♂ *Lobrathium biaculeatum* sp. n., det. V. Assing 2012" (cAss). Paratypes: 1♀: "Nepal, Khandbari District / above Sheduva, 3000 m, 31.III.–1.IV.1982, A. & Z. Smetana" (cSme); 1♀: "Nepal, Khandbari District / For. above Ahale [=Ahali], 2400 m, 25.III.82, A. & Z. Smetana" (cSme).

Etymology. The specific epithet (Latin, adjective) refers to the two needle-shaped processes of the male sternite VII, a unique character separating this species from all its congeners.

Description. Body length 6.6–8.2 mm; length of forebody 3.6–3.9 mm. Coloration: head, pronotum, and abdomen blackish; elytra uniformly blackish or with indistinctly paler posterior margins; legs yellowish, with the profemora, at least the basal portion of the protibiae, the apices of the meso- and metafemora, and sometimes the bases of the meso- and metatibiae infuscate; antennae reddish to brown.

Head weakly oblong or approximately as broad as long; posterior angles weakly marked; punctation coarse and dense, more or less distinctly sparser in median dorsal portion. Eyes large and distinctly convex, at least slightly more than half as long as distance from posterior margin of eye to neck in dorsal view. Antenna moderately slender, approximately 1.9–2.0 mm long.

Pronotum 1.20–1.25 times as long as broad and approximately as wide as head, weakly tapering posteriad, lateral margins weakly convex; punctation similar to that of head.

Elytra moderately short, approximately 0.9 times as long as pronotum; humeral angles marked; punctation coarse and arranged in oblique, more or less regular series. Hind wings present, but possibly of reduced length.

Abdomen slightly broader than elytra; punctation dense and relatively coarse in anterior half of tergite III, gradually becoming finer and sparser towards the abdominal apex; microsculpture shallow and transverse, sometimes practically obsolete on anterior tergites; posterior margin of tergite VII with palisade fringe; posterior margin of tergite VIII indistinctly angled in the middle.

♂: sternite VII highly distinctive, strongly transverse, posterior margin with broad and deep, semi-circular posterior excision, on either side of this incision with long process (Fig. 109); sternite VIII with extensive median impression without pubescence and with rather deep posterior excision (Fig. 110); aedeagus 1.55 mm long, ventral process of highly distinctive shape, somewhat asymmetric in ventral view (Figs 111–112).

♀: tergite X without evident modifications.

Comparative notes. *Lobrathium biaculaeatum* is readily identified based on the conspicuous morphology of the male sternite VII and of the aedeagus. It is additionally distinguished from *L. wittmeri* by the much coarser punctation of the forebody, the larger and more bulging eyes, the seriate punctation of the elytra, the paler legs, and the shape of the elytra (*L. wittmeri*: shorter and with less pronounced humeral angles in the micropterous morph, longer in the macropterous morph).

Distribution and natural history. The type specimens were collected in three localities in Khandbari district, eastern Nepal (Fig. 66), at altitudes of 2300–3000 m. Since the two paratypes are females, the possibility that they in fact refer to different species cannot be ruled out with absolute certainty, but no convincing evidence was found that they should not be conspecific with the holotype.

Lobrathium bicarinatum sp. n. (Figs 89, 113–118)

Type material. Holotype ♂: "India: Uttaranchal state, ca. 30 km N of Bageshwar, Khati vill. env., 2100–2300 m, 27.–30.VI.2003, Z. Kejval & M. Trýzna / Holotypus ♂ *Lobrathium bicarinatum* sp. n., det. V. Assing 2011" (cAss). Paratypes: 3♂♂, 2♀♀: same data as holotype (cSch, cAss); 1♀: "Sikles-Mts., upp. Khilang & Chipli, 1.8.95, 23–2500 m / Nepal Annapurna Mts., leg. Fabrizi, Jäger, Schmidt" (SDEI).

Etymology. The specific epithet (Latin, adjective: with two carinae) refers to the shape of the male sternite VIII.

Description. Body length 7.0–8.7 mm; length of forebody 4.2–4.8 mm. Habitus as in Fig. 113. Coloration: whole body blackish, except for the dark-reddish tarsi and the reddish-yellow posterior margin of tergite VII.

Head (Fig. 114) approximately as long as broad; posterior angles broadly rounded; punctation very dense, with the interstices reduced to narrow ridges, and moderately coarse, median dorsal portion and frons sparsely punctate

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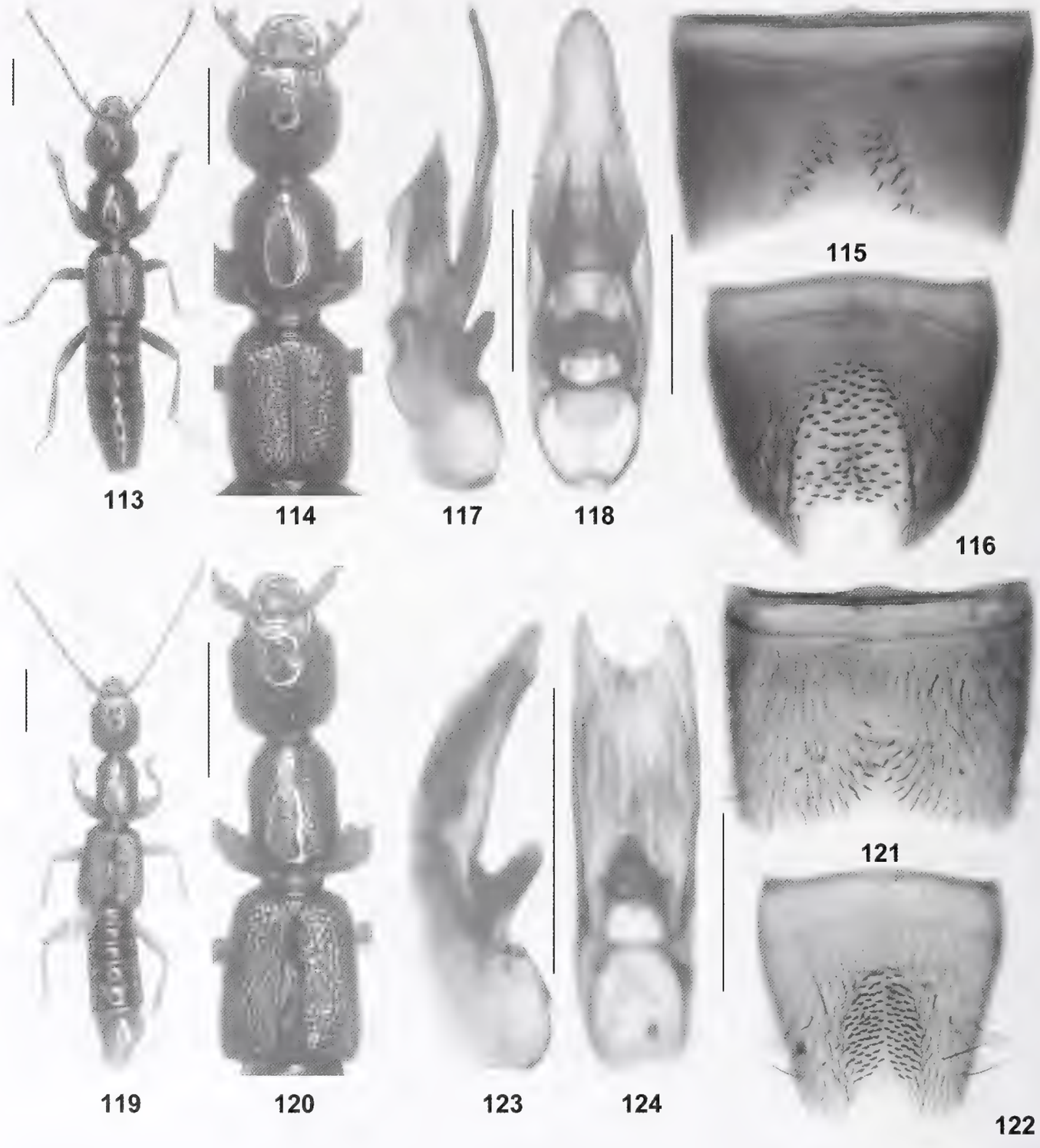

Figs 113–124. *Lobrathium bicarinatum* **(113–118)** and *L. cylindricolle*, lectotype **(119–124)**. **113, 119:** habitus; **114, 120:** forebody; **115, 121:** male sternite VII; **116, 122:** male sternite VIII; **117–118, 123–124:** aedeagus in lateral and in ventral view. Scale bars: 113–114, 119–120: 1.0 mm; 115–118, 121–124: 0.5 mm.

or impunctate; interstices without microsculpture. Eyes moderately large, approximately half as long as distance from posterior margin of eye to neck, or slightly shorter. Antenna 2.5–2.9 mm long.

Pronotum (Fig. 114) approximately 1.15 times as long as broad and slightly narrower than head, lateral margins distinctly converging posteriad in dorsal view; punctation distinctly sparser than that of head.

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Elytra (Fig. 114) approximately 0.95 times as long as, and distinctly broader than pronotum; humeral angles moderately marked; punctation coarse, dense, and not arranged in series; interstices without microsculpture and glossy. Length of hind wings not examined.

Abdomen narrower than elytra; punctation very fine and moderately dense; posterior margin of tergite VII with palisade fringe; tergite VIII without sexual dimorphism, posterior margin weakly convex, almost truncate, in both sexes.

♂: sternite VI with shallow median impression posteriorly; sternite VII with rather deep median impression posteriorly, this impression with pair of clusters of modified, short and stout black setae, posterior margin broadly concave (Fig. 115); sternite VIII weakly transverse, with extensive and deep median impression, this impression with numerous modified, short and stout black setae, and on either side delimited by pronounced carinae, posterior excision of trapezoid shape (Fig. 116); aedeagus 1.5–1.6 mm long, with strongly sclerotized blade-shaped ventral process (Figs 117–118).

Comparative notes. This species is characterised particularly by the conspicuous shape and chaetotaxy of the male sternite VIII, as well as by the morphology of the aedeagus. It is readily distinguished from some other Himalayan representatives of the genus with a uniformly blackish body (e.g., *L. wittmeri, L. alticola*) by much larger size and broader body alone.

Distribution and natural history. The type locality is situated to the north of Bageshwar in Uttaranchal, North India (Fig. 89), at an altitude of 2100–2300 m. A female paratype was collected in the Annapurna range, central Nepal, at an altitude of 2300–2500 m.

***Lobrathium cylindricolle* (Cameron, 1924)** (Figs 66, 119–124)

Lathrobium (*Lobrathium*) *cylindricolle* Cameron, 1924: 194 f.

Type material examined. Lectotype ♂, present designation: "Nun Nadi, Dehra Dun. / Dr. Cameron. 15.10.22. / Lathrobium cylindricolle Cam. / Type H.T. / M.Cameron. Bequest. B.M. 1955–147. / Lectotypus ♂ *Lathrobium cylindricolle* Cameron, desig. V. Assing 2011 / Lobrathium (?) cylindricolle (Cameron), det. V. Assing 2011" (BMNH).

Comment. The original description of *L. cylindricolle* is based on an unspecified number of syntypes, among them at least one male, from "Dehra Dun District; Nun Nadi"(Cameron 1924). A male syntype was located in the Cameron collection at the BMNH; it is designated as the lectotype. An examination of this specimen revealed that the generic assignment of *L. cylindricolle* is somewhat doubtful. The elytra lack the submarginal carina usually found in the genus and the pronotum is narrower and more oblong than is usually the case in the genus. In general, the facies somewhat resembles that of *Pseudobium* Mulsant & Rey, 1878, but the male primary and secondary sexual characters resemble those of *Lobrathium*. Until the generic affiliations of *L. cylindricolle* are clarified, the species is tentatively retained in *Lobrathium*.

Redescription. Body length 6.5 mm; length of forebody 3.7 mm. Habitus as in Fig. 119. Coloration: head and elytra reddish; pronotum dark-reddish; abdomen reddish-brown, except for the reddish apex (segments VII–X); legs reddish-yellow; antennae reddish. (Note that, according to the original description, the pronotum and the abdomen, except for the red apex, are black.)

Head (Fig. 120) distinctly oblong, 1.13 times as long as broad; posterior angles moderately marked; punctation dense and coarse, median dorsal portion more sparsely punctate; interstices without microsculpture. Eyes large, slightly more than half the length of postocular region in dorsal view. Antenna long and slender, 2.5 mm long.

Pronotum (Fig. 120) long and slender, 1.47 times as long as broad and approximately 0.8 times as wide as head, subparallel, lateral margins straight in dorsal view; punctation similar to that of head.

Elytra (Fig. 120) long, approximately 1.05 times as long as, and distinctly broader than pronotum; humeral angles marked; punctation coarse and dense, not arranged in series; interstices without microsculpture. Hind wings fully developed.

Abdomen narrower than elytra; punctation fine and moderately dense; microsculpture almost obsolete on tergites III–VI and distinct on tergites VII–VIII; posterior margin of tergite VII with palisade fringe.

♂: sternite VII weakly impressed and with weakly modified pubescence in the middle, posterior margin broadly concave (Fig. 121); sternite VIII with distinct and broad median impression, this impression with numerous modified, short and stout black setae, posterior excision broadly concave and not very deep (Fig. 122); aedeagus 0.8 mm long, ventral process bifid apically (Figs 123–124).

Distribution. This species is currently known only from the type locality in Uttaranchal, northern India (Fig. 66).

***Lobrathium* sp. n. 1**

Material examined. 1♀: "E. Nepal: Kosi, Val. Induwa Kola, 2000 m, 2.IV.84, Löbl – Smetana" (MHNG).

This undescribed species is characterised by large body size (body length: 10 mm; length of forebody: 4.6 mm), uniformly blackish body with reddish legs and antennae (except for the infuscate profemora), short elytra (0.7 times as long as pronotum), and completely reduced hind wings.

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Lobrathium sp. n. 2

Material examined. 1♀: "377 Taplejung Dist., upper Tamur Valley, below Walungchung Gola, mixed forest, open river bank, 2400–2700 m, 20 May 1988, J. Martens & W. Schawaller leg." (SMNS).

This undescribed species is characterised by small body size (body length: 5.7 mm; length of forebody: 3.0 mm), uniformly blackish body, short elytra, and reduced hind wings. In general appearance it is most similar to *L. alticola*.

Lobrathium sp. n. 3

Material examined. 1♀: "Nepal, Khandbari District / "Bakan" W of Tashigaon, 3200 m, 5.IV.1982, A. & Z. Smetana" (cSme).

This unnamed species is characterised by rather large body size (body length: 9.3 mm; length of forebody: 5.5 mm), uniformly blackish brown coloration, and a strongly convex female tergite X with a spine-like posterior extension. As can be inferred from the morphology of tergite X, this species is not conspecific with *L. biaculeatum*.

Lobrathium sp. n. 4

Material examined. 1♀: "Nepal Khandbari Distr. Induwa Khola Valley 2000 m, 17.IV.84 Smetana & Löbl" (cSme).

This species is similar to the preceding species, but slightly smaller (body length: 8.5 mm; length of forebody: 4.9 mm), and the female tergite X lacks the posterior spine-like extension. The legs are completely blackish-brown with pale tarsi.

THE *LOBRATHIUM* SPECIES OF MAINLAND CHINA

Key to species

The following key does not account for *L. emeiense*, whose description is based on a single female holotype from the Emei Shan in Sichuan. For a key to the *Lobrathium* species of Taiwan see Assing (2010).

1. Elytra with posterior portion partly or completely yellowish or reddish, mostly with yellowish spots, and often with bluish to purple hue 2
– Elytra uniformly dark-brown to blackish 16
2. Elytra with more extensive yellowish coloration posteriorly, at least posterior two fifths completely yellowish (Figs 187–188, 194–195) 3
– Elytra less extensively yellowish or reddish posteriorly, usually with more or less defined spots often leaving the lateral and/or posterior margins blackish 4
3. ♂: posterior excision of sternite VIII smaller and less deep (Fig. 197); aedeagus 1.1 mm long, with ventral process apically spattle-shaped (Figs 198–199). Shaanxi: Qinling Shan .....***schuelkei*** sp. n.
– ♂: posterior excision of sternite VIII slightly larger and somewhat deeper (Fig. 190); aedeagus larger, 1.2–1.3 mm long, ventral process apically with two long processes (Figs 191–192). Hubei, Beijing (Fig. 193) .....***taureum*** sp. n.
4. Large species; length of forebody at least 4.9 mm. Pronotum broad, 1.10–1.20 times as long as broad (Figs 201, 224). Elytra 0.90–0.95 times as long as pronotum and without bluish hue. ♂: sternite VIII with distinctly modified, short and stout black setae; sternite VIII with conspicuously deep posterior excision, its depth at least approximately half the length of sternite; ventral process of aedeagus ventrally with rasp-like structures 5
– Smaller species; length of forebody 4.6 mm at most. Pronotum more slender, 1.20–1.35 times as long as broad, only in one species broader (*L. radens*). Elytra often longer than pronotum and often with bluish or purple hue. ♂: sternite VII in most species without strongly modified setae; sternite VIII with less deep posterior excision, except in *L. bispinosum* and *L. tuberosum* 6
5. Pronotum slightly broader, 1.10–1.15 times as long as broad (Fig. 224). ♂: sternite VII as in Fig. 225; posterior excision of sternite VIII extremely deep, reaching well beyond middle of sternite (Fig. 226); aedeagus 1.6 mm long, ventral process with two rasp-like projections and stoutly blade-shaped (Figs 227–228). Northern Yunnan: Diancang Shan (Fig. 180) .....***excisissimum*** sp. n.
– Pronotum slightly less broad, 1.15–1.20 times as long as broad (Fig. 201). ♂: sternite VII as in Fig. 202; posterior excision of sternite VIII less deep, approximately reaching middle of sternite (Fig. 203); aedeagus 1.5 mm long, ventral process with more numerous rasp-like projections, somewhat more slender and apically more acute in ventral view (Figs 204–205). Eastern Guizhou: Leigong Shan (Fig. 153) .....***radens*** sp. n.
6. Elytral spots situated in anterior portion of posterior half of elytra (i.e., at some distance from posterior margin (Fig. 218). Dorsal surface of head uneven, with median and lateral impressions. Punctation of head and pronotum extremely dense (Fig. 218). Relatively large species; length of forebody 4.4–4.6 mm. Antennae slender (Fig. 219). ♂: sternite VII moderately transverse (Fig. 220); sternite VIII as in Fig. 221; aedeagus 1.35 mm long, ventral process apically bifid (Figs 222–223). Western Hubei: Daba Shan. .....***ablectum*** sp. n.
– Elytral spots situated at or near posterior margin of elytra. Dorsal surface of head without distinct impressions. Punctation of head and pronotum less dense. Smaller species, length of forebody usually 4.0 mm at most, except for *L. spathulatum* (3.7–4.5 mm).

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Male sexual characters different. A reliable identification of the following species is possible only based on the male sexual characters 7

7. Elytra black, without bluish or purple hue, 0.9–1.0 times as long as pronotum 8
– Elytra usually with, rarely without bluish or purple hue, 1.0–1.15 times as long as pronotum 12
8. ♂: sternite VIII with small posterior excision in asymmetric position, posterior margin with tooth-like projection on either side of the excision (Fig. 136–137); aedeagus approximately 1.5 mm long, ventral process very long, slender, and apically asymmetric (Figs 138–139). Widespread: Sichuan, Shaanxi, Hubei (Fig. 140) .....***tortile*** Zheng
– ♂: sternite VIII with deep posterior excision in symmetric position; aedeagus of different morphology 9
9. ♂: aedeagus 0.9–1.0 mm long, ventral process long, slender, apically acute, and very thin at base (Fig. 152); sternite VIII with very broad and deep posterior excision, on either side of excision with dense pubescence (Fig. 151); sternite VII as in Fig. 150. Central Sichuan: Qingcheng Shan (Fig. 153 .....***gladiatum*** Zheng
– Male sexual characters different 10
10. ♂: sternite VII anteriorly with tubercle (Figs 182, 184); sternite VIII oblong and with U-shaped posterior excision (Fig. 183); aedeagus 1.2 mm long and with massive ventral process (Figs 185–186). Jiangxi (Fig. 141) .....***tuberosum*** sp. n.
– ♂: sternite VII without tubercle; posterior excision of sternite VIII of different shape; aedeagus longer, at least approximately 1.4 mm long 11
11. ♂: sternite VII with shallow posterior excision with pubescence (Fig. 272); sternite VIII with moderately deep posterior excision and of characteristic chaetotaxy (Fig. 273); aedeagus 1.4 mm long and with ventral process of distinctive shape (Figs 274–275). Northeastern Hubei (Fig. 180) .....***demptum*** sp. n.
– ♂: sternite VII with more pronounced posterior impression without pubescence (Fig. 176); posterior excision of sternite VIII much deeper, broader, and of subtrapezoid shape (Fig. 177); aedeagus longer, 1.5 mm long, ventral process with two tooth-like projections ventrally (Figs 178–179). Southeastern Guizhou (Fig. 141) .....***bispinosum*** sp. n.
12. Elytra with weak purple hue; posterior spots relatively small, defined, and of circular shape. Pronotum less oblong, approximately 1.2 times as long as broad (Figs 206–207). ♂: sternite VII moderately transverse and with moderately modified setae (Fig. 208); sternite VIII not transverse and with moderately deep posterior excision (Fig. 209); aedeagus 1.0 mm long, ventral process with dorsal carina and apically acute (Figs 210–211). Northern Yunnan (Fig. 153) .....***retrocarinatum*** sp. n.
– Elytra usually with bluish hue; posterior spots usually larger and/or of different shape or less defined. Pronotum more oblong, at least approximately 1.25 times as long as broad. ♂: sternite VII either with strongly modified short and stout black setae or without modified setae at all; sternite VIII and aedeagus of different shape 13
13. ♂: sternite VII with distinctly modified short and stout black setae (Fig. 144); sternite VIII with deep U-shaped posterior excision (Fig. 145); aedeagus approximately 1.2 mm long, ventral process of distinctive morphology (Figs 146–147). Sichuan, Shaanxi, Hubei (Fig. 153) .....***hebeatum*** Zheng
– ♂: sternite VII without distinctly modified setae; sternite VIII with less deep and differently shaped posterior excision; aedeagus of different morphology 14
14. ♂: posterior excision of sternite VII small (Fig. 128); aedeagus approximately 1.0 mm long and shaped as in Figs 129–132. Widespread and common species: China, Taiwan, southern Japan (Fig. 140) .....***hongkongense*** (Bernhauer)
– ♂: posterior excision of sternite VII larger and of broadly triangular shape; aedeagus of different shape. Species with more restricted distributions 15
15. ♂: aedeagus of somewhat variable shape and size, 1.3–1.5 mm long, ventral process very slender, apically acute, and weakly asymmetric (Figs 160–165); sternites VII and VIII as in Figs 156–159. Widespread in China: Shaanxi, Sichuan, Hubei, Yunnan (Fig. 153).....***configens*** sp. n.
– ♂: aedeagus longer, 1.6–1.8 mm long, ventral process distinctly asymmetric and apically distinctly dilated (ventral view) (Figs 170–173); sternites VII and VIII as in Figs 168–169. Widespread in China: Sichuan, Shaanxi, Shanxi, Hubei, Zhejiang (Fig. 180) .....***spathulatum*** sp. n.
16. Largest representative of the genus in China; length of forebody approximately 6.0 mm; length of antennae approximately 4.0 mm. Head distinctly oblong, of ovoid shape, and with conspicuously dense and fine punctation (Figs 229–230). Zhejiang: Tianmushan .....***rotundiceps*** (Koch)
– Distinctly smaller species; length of forebody less than 5.0 mm; length of antennae 3.3 mm at most. Head of different shape and with coarser punctation 17
17. Posterior margin of abdominal tergite VII without palisade fringe. Eyes small, distinctly less than half the length of distance from posterior margin of eye to neck in dorsal view 18
– Posterior margin of abdominal tergite VII at least with narrow rudiment of a palisade fringe. Eyes often larger 19
18. Slightly smaller species; length of forebody 3.4–3.6 mm. Eyes larger, their length more than one third of

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the distance from posterior margin of eye to neck in dorsal view (Fig. 232). Punctation of head less dense and somewhat sparser on vertex (Fig. 232). ♂: sternite VII without modified spines (Fig. 238); sternite VIII as in Fig. 239; aedeagus 0.9 mm long, shaped as in Figs 240–241. Southeastern Tibet (Fig. 141) .....***cholaicum*** sp. n.

– Slightly larger species; length of forebody 3.8 mm. Eyes smaller, their length little more than one fourth of the distance from posterior margin of eye to neck in dorsal view (Fig. 266). Punctation of head (except frons) conspicuously dense; dorsal surface matt (Fig. 266). ♂: sternite VII with few modified, short and stout black setae in median impression (Fig. 267); sternite VIII of different chaetotaxy (Fig. 268); aedeagus 1.0 mm long, ventral process slightly asymmetric (ventral view), and more slender both in ventral and in lateral view (Figs 269–270). Southwestern Sichuan (Fig. 180) .....***lamellatum*** sp. n.

19. Larger species; length of forebody 4.1–4.8 mm; length of antennae 3.0–3.3 mm 20

– Smaller species; length of forebody 3.3–4.1 mm; length of antennae 1.9–2.2 mm 21

20. Forebody dark-brown. Elytra monomorphic. ♂: sternites VII and VIII as in Figs 214–215; aedeagus 1.8 mm long, ventral process long and slender (Figs 216–217). Northeastern Sichuan (Fig. 193) .....***feldmanni*** sp. n.

– Forebody black. Wing-dimorphic species (Figs 254–255). ♂: sternites VII and VIII as in Figs 256–257; aedeagus much smaller, 1.1 mm long, ventral process very slender and apically curved in lateral view (Figs 258–259). Yunnan, Sichuan (Fig. 193) .....***duplex*** sp. n.

21. Eyes very small, one third as long as distance from posterior margin of eyes to neck (Fig. 261). Elytra short, 0.7 times as long as pronotum (Fig. 261). ♂: sternite VII as in Fig. 262; posterior excision of sternite VIII with semi-transparent margins (Fig. 263); aedeagus small, 0.75 mm long, ventral process broad in ventral view (Figs 264–265). Southern Sichuan (Fig. 141) .....***domenoides*** sp. n.

– Eyes at least slightly larger, at least half as long as distance from posterior margin of eyes to neck, or nearly so. Elytra longer, at least approximately 0.80 times as long as pronotum. Male sexual characters different; posterior excision of sternite VIII with fully sclerotised margins 22

22. Wing-dimorphic species (Figs 243–244). ♂: aedeagus approximately 1.0 mm long, ventral process slender in ventral view (Figs 247–252); sternites VII and VIII as in Figs 245–246. Yunnan (Fig. 141) .....***bimembre*** sp. n.

– Micropterous species (Fig. 237). ♂: ventral process of aedeagus broader in ventral view (Figs 240–241); sternites VII and VIII as in Figs 238–239. Sichuan: Daxue Shan (Fig. 180) .....***daxuense*** sp. n.

***Lobrathium hongkongense* (Bernhauer, 1931)** (Figs 125–132, 140)

Lathrobium (Lobrathium) hongkongense Bernhauer, 1931: 127 f.
Lobrathium sibynium Zheng, 1988: 186 f.; **syn. n.**
Lobrathium ryukyuense Ito, 1996a: 114 ff.; **syn. n.**

Type material examined. *L. hongkongense*: Lectotype ♂: present designation: "7 / Hong Kong. J. J. Walker. / hongkongensis [sic] Bernh. Cotypus / Chicago NHMus, M.Bernhauer Collection / Lectotypus ♂ *Lathrobium hongkongense* Bernhauer, desig. V. Assing 2012 / Lobrathium hongkongense (Bernhauer), det. V. Assing 2012 (FMNH). Paralectotypes: 1♂ [dissected prior to present study; somewhat damaged]: "Hong Kong. Walker Coll., 93–58. / British Museum / hongkongensis Brh. Type / hongkongensis Bernh. Typus / Chicago NHMus, M.Bernhauer Collection" (FMNH); 1♀: "Hong Kong. Walker Coll., 93–58. / hongkongensis Bernh. Cotypus / Chicago NHMus, M.Bernhauer Collection" (FMNH).

L. ryukyuense: Paratypes: 1♂, 1♀: "Kametsu Tokuno Shima Is., 29.III.1966, T. Ito / Paratype Lobrathium ryukyuense T. Ito. sp. nov. / Lobrathium hongkongense (Bernhauer), det. V. Assing 2012" (cAss).

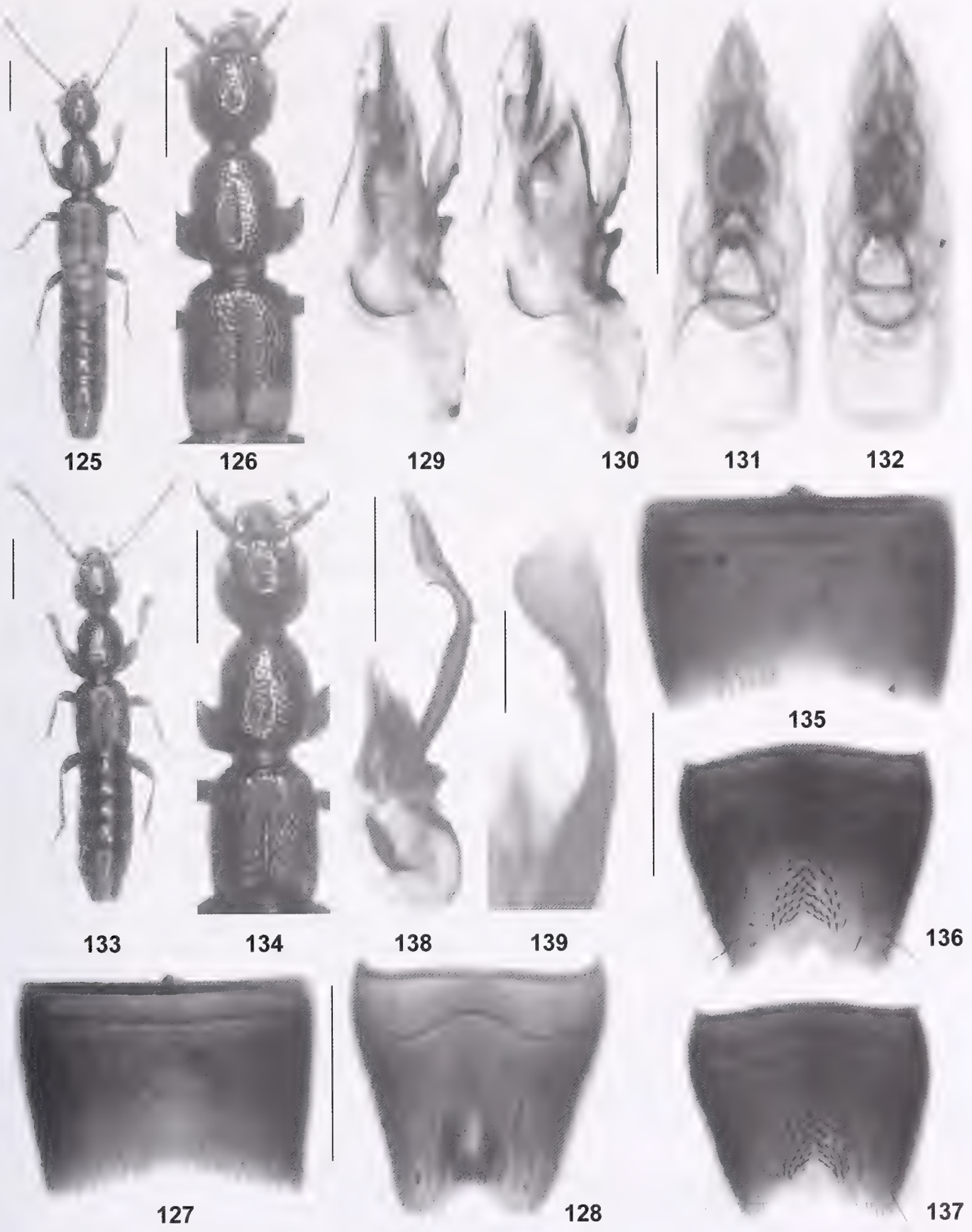
Comment. *Lathrobium hongkongense* was described from an unspecified number of syntypes, among them at least one male, from "Hongkong, gesammelt von J. J. Walker" (Bernhauer 1931). One of the three syntypes in the Bernhauer collection at the FMNH, a male in good condition, is designated as the lectotype. According to the original description, additional syntypes, now paralectotypes, are desposited in the collections of the BMNH.

The original description of *L. sibynium* is based on numerous specimens from Sichuan (Zheng 1988). Type material was not examined, but the descriptive details and the illustrations provided by Zheng (1988), as well as the fact that material of this widespread species was seen also from Sichuan leave little doubt that *L. sibynium* is conspecific with *L. hongkongense*.

Lobrathium ryukyuense was described from various localities in the Ryuku Islands, southern Japan (Ito 1996a). An examination of two paratypes made available to me by Tateo Ito revealed that they are conspecific with the holotype of *L. hongkongense*. Hence the synonymy proposed above.

For illustrations of the sexual characters of males from Taiwan (as *L. sibynium*) see Assing (2010).

Additional material examined. China: Zhejiang: 17 exs. [partly teneral], Gutianshan National Nature Reserve, 13.–18.III.2008, leg. Aßmann (cFel, cAss, cSch). **Jiangsu:** 1♂, 1♀, Zhenjiang ["Chinkiang"] (FMNH, cAss). **Sichuan:** 1♀, 60 km W Cheng-



Figs 125–139. *Lobrathium hongkongense* (**125–132**; **130–131**: lectotype) and *L. tortile* (**133–139**). **125, 133:** habitus; **126, 134:** forebody; **127, 135:** male sternite VII; **128, 136–137:** male sternite VIII; **129–132, 138:** aedeagus in lateral and in ventral view; **139:** apex of ventral process of aedeagus in ventral view. Scale bars: 125–126, 133–134: 1.0 mm; 127–132, 135–138: 0.5 mm; 139: 0.2 mm.

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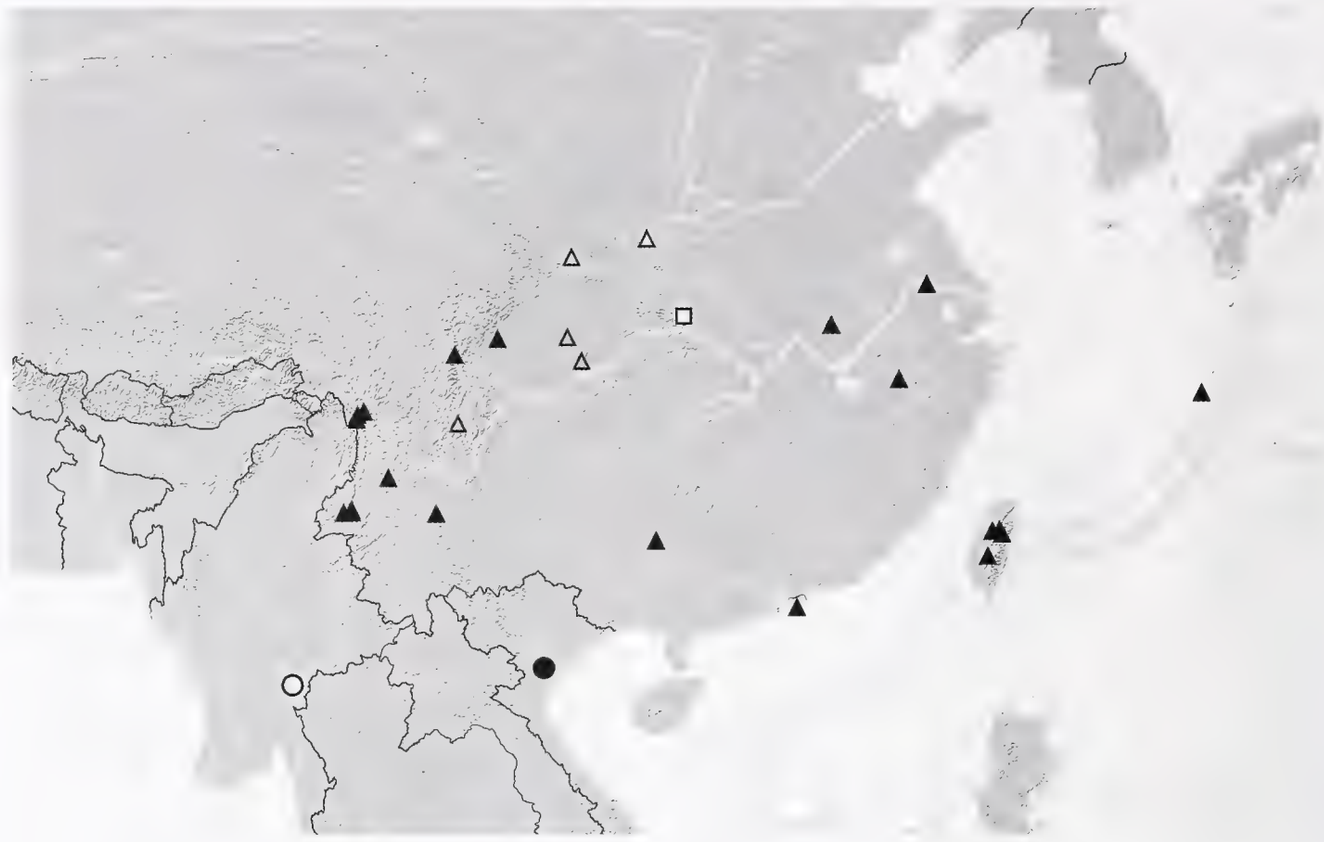

Fig. 140. Distributions of *Lobrathium guttula* (open circle), *L. discrepans* (filled circle), *L. ablectum* (open square), and *L. hongkongense* (triangles), based on revised male-based records (black triangles), revised female-based records (white triangles), and literature records by Zheng (1988) (grey triangles).

du, 1000 m, V.1997, leg. Reuter (cFel); 1♀, Daxue Shan, river valley 5 km E Kangding, 30°03'N, 102°00'E, 2500–2800 m, 20.–23.V.1997, leg. Wrase (cSch). **Yunnan:** 8 exs., 100 km W Kunming, Diaolin Nat. Res., 22.V.–2.VI.1993, leg. Jendek & Sausa (NHMW, cAss); 1♂, Baoshan Pref., Gaoligong Shan, 29 km ESE Tengchong, 24°56'N, 98°45'E, 2350 m, degraded deciduous forest with shrubs, sifted, 1.VI.2007, leg. Wrase (cAss); 1♂, 2♀♀, Baoshan Pref., Gaoligong Shan, 33 km SE Tengchong, 24°51'N, 98°46'E, 2100–2200 m, creek bank in pasture, under gravel and stones, 31.V.2007, leg. Schülke & Wrase (cSch, cAss); 1♂, Nujiang Lisu Aut. Pref., Gongshan Co., Gaoligong Shan, tributary of Salween river, 1 km above Gongshan, 27°46'N, 98°39'E, 1500 m, old flood debris, 20.VI.2005, leg. Schülke (cSch); 2♂♂, 3♀♀ [partly teneral], Nujiang Lisu Aut. Pref., Gongshan Co., 17 km N Gongshan, small creek valley, 27°55'N, 98°40'E, 1525–1600 m, creek bank, 20.VI.2005, leg. Schülke (cAss); 1♂, Baoshan Pref., mountain range 22 km S Tengchong, 24°49'N, 98°29'E, 1750 m, loamy banks of fish ponds, 2.VI.2007, leg. Wrase (cSch); 1♂, Dali Bai Aut. Pref., Diancang Shan, E pass, 44 km NW Dali, 26°02'N, 99°57'E, 2110 m, loamy river bank with gravel and decaying debris, 23.VIII.2009, leg. Wrase (cSch); 1♀, Yanmen, 13.–23.VI.2005, leg. Kučera (cSch). **Guangxi:** 22 exs., 10 km N Liuzhou, 150–200 m, 11.XI.1993, leg. Schillhammer (NHMW, cAss). **Hubei:** 16 exs. [partly teneral], Dabie Shan, Wujianshan Forest Park, 31.1°N, 115.8°E, 17.–18.VI.2003, leg. Turna (NHMW, cAss). **Shaanxi:** 1♀, Lueyang, 23.–26.VI.2004, leg. Kučera (cSch); 1♀, ca. 35 km S Xian, Nan Wutai, 19.IX.1980, leg. Hammond (BMNH).

Redescription. Body length 6.3–7.3 mm; length of forebody 3.4–3.9 mm. Habitus as in Fig. 125. Coloration: head, pronotum, and abdomen black; elytra of very variable coloration, black, mostly with weak bluish hue, posteriorly with pale-reddish to dark-reddish spot of variable size: small, transverse, weakly delimited, and reaching neither posterior margins nor suture in specimens from Taiwan, larger, subcircular, well-delimited, often reaching posterior margin, but not suture and lateral margins in specimens from mainland China; legs blackish, with reddish tibial bases and tarsi; antennae brown with infuscate antennomere I.

Head (Fig. 126) 1.00–1.10 times as long as broad, usually widest across eyes, somewhat narrowed behind eyes; posterior angles broadly rounded; punctation of dorsal surface coarse and moderately dense, in median dorsal portion somewhat sparser (but not impunctate); interstices without microsculpture. Eyes large and prominent, of somewhat variable size, slightly to distinctly more than half as long as distance from posterior margin of eye to neck. Antenna 1.7–2.0 mm long.

Pronotum (Fig. 126) slender, 1.25–1.30 times as long as broad and slightly narrower than head, lateral margins very weakly convex, subparallel or weakly converging posteriad in dorsal view; punctation similar to that of head.

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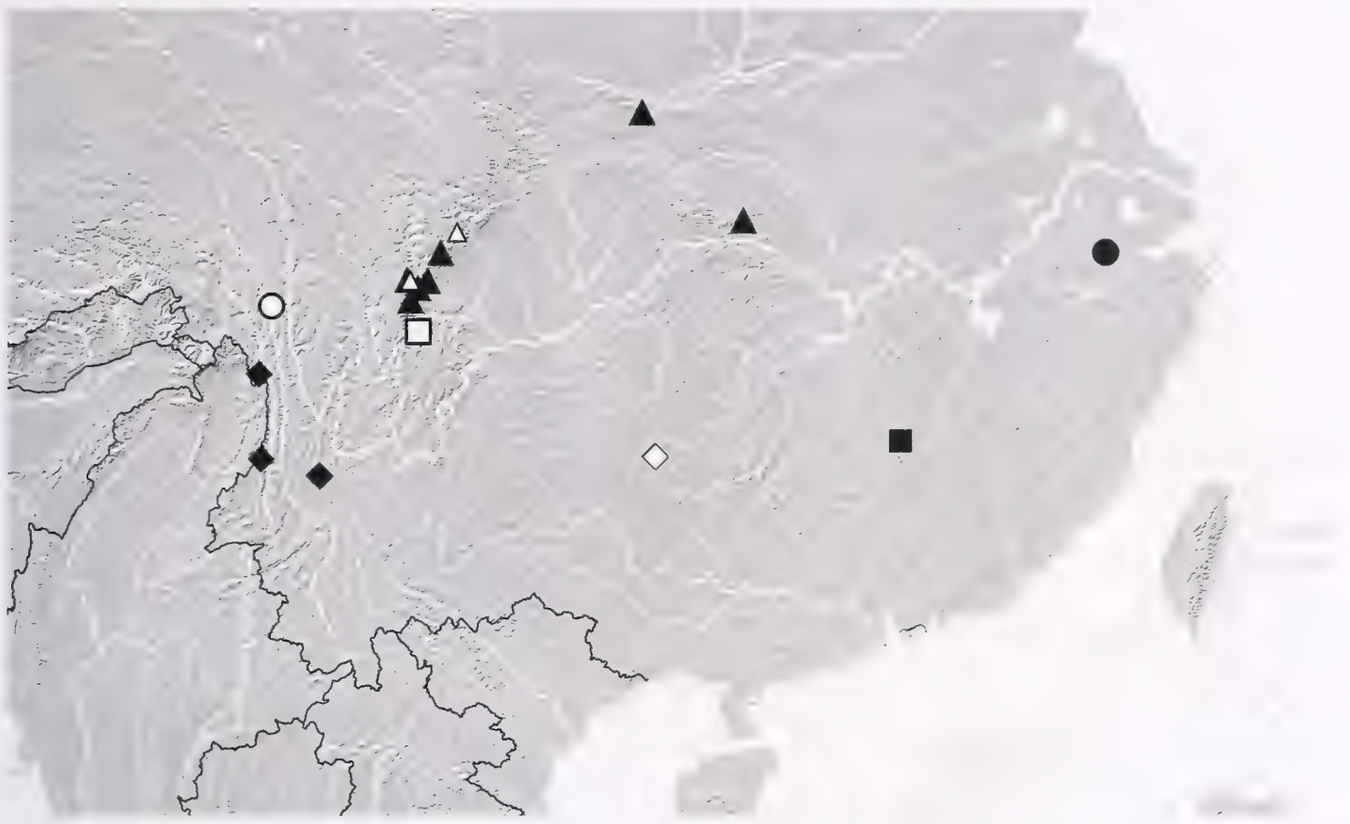

Fig. 141. Distributions of *Lobrathium* species in China: *L. cholaicum* (open circle); *L. bimembre* (filled diamonds); *L. domenoides* (open square); *L. bispinosum* (open diamonds); *L. tuberosum* (filled square); *L. rotundiceps* (filled circle); *L. tortile* (triangles), based on revised records (filled triangles) and literature records by Zheng (1988) (open triangles).

Elytra (Fig. 126) long, usually at least slightly longer than pronotum; humeral angles marked; punctation coarse, dense, and arranged in somewhat irregular series; interstices without microsculpture and glossy. Hind wings fully developed.

Abdomen usually slightly narrower than elytra; punctation fine and dense; interstices with fine microsculpture; posterior margin of tergite VII with palisade fringe; tergite VIII with sexual dimorphism.

♂: tergite VIII broadly convex posteriorly; sternite VII with moderately deep median impression without pubescence posteriorly, posterior margin broadly concave (Fig. 127); sternite VIII weakly transverse, posteriorly with distinct median impression, this impression with numerous modified, short and stout black setae, posterior excision relatively small, with truncate anterior margin (Fig. 128); aedeagus approximately 1 mm long, ventral process blade-shaped, symmetric, bisinuate and dorso-ventrally flattened in lateral view (Figs 129–132).

♀: posterior margin of tergite VIII convexly produced in the middle.

Intraspecific variation. This widespread species is highly variable, more so than most other East Palaearctic congeners, particularly regarding the coloration and length of the elytra, head shape, and eye size.

Comparative notes. *Lobrathium hongkongense* is distinguished from its congeners particularly by the shape and chaetotaxy of the male sternite VIII, as well as by the morphology of the aedeagus, from some Chinese species also by the shape of the female tergite VIII.

Distribution and natural history. This species was originally described Hong Kong and subsequently reported from Sichuan and Taiwan (as *L. sibynium*) (Assing 2010, Zheng 1988). The above records from Zhejian, Jiangsu, Yunnan, Guangxi, and Hubei, as well as the localities of the types of *L. ryukyuense* suggest that *L. hongkongense* is widespread and not uncommon in the southeast of the East Palaearctic (Fig. 140). The female-based records from Shaanxi require confirmation. For additional records from the Ryukyu Islands (as *L. ryukyuense*) see Watanabe (1998a) and Ito (2010). Teneral specimens were found in March and June.

Lobrathium tortile Zheng, 1988 (Figs 133–140)

Lobrathium tortile Zheng, 1988: 187 ff.

Comment. The original description is based on 57 type specimens from two localities in Sichuan (Zheng 1988). The types were not examined, but, based on the illustra-

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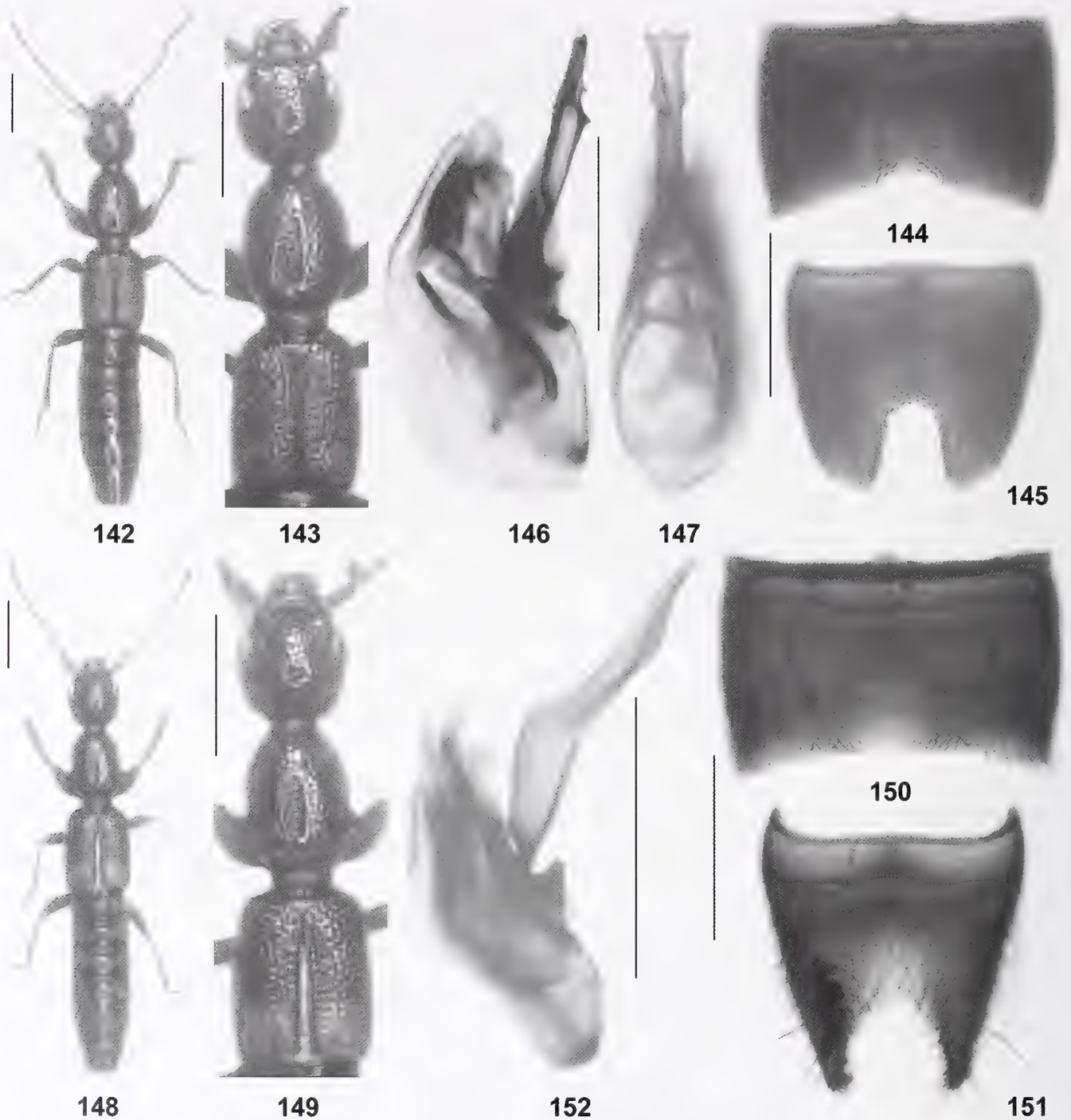

Figs 142–152. *Lobrathium hebeatum* (**142–147**) and *L. gladiatum* (**148–152**). **142, 148:** habitus; **143, 149:** forebody; **144, 150:** male sternite VII; **145, 151:** male sternite VIII; **146–147, 152:** aedeagus in lateral and in ventral view. Scale bars: 142–143, 148–149: 1.0 mm; 144–147, 150–152: 0.5 mm.

tions and descriptive details provided by Zheng (1988), there is no doubt that the material listed below is conspecific with the holotype.

Material examined. China: Sichuan: 5♂♂, 3♀♀, Daxue Shan, W env. Kangding, 30°03'N, 101°57'E, 2600–2700 m, 22.–24.V.1997, leg. Wrase (cSch, cAss); 6♂♂, 2♀♀, same data, but 2700–2800 m, 24.V.1997, leg. Schülke (cSch, cAss); 1♂, Ya'an Pref., Tianquan Co., Jiajin Shan, 54 km W Ya'an, valley below Labahe N. R. St., 30°03'N, 102°27'E, 1500 m, river bank, 12.VII.1999, leg. Wrase (cSch); 1♂, Ya'an Pref., Baoxing Co., Jiajin Shan, 78 km NNW Ya'an, river valley 3 km S Qiaoqi, 30°40'N, 102°45'E, 1950 m, river bank, 11.VII.1999, leg. Wrase (cSch); 1♂, 1♀, Ganzi Tibet. Aut. Pref., Luding Co., 7 km S Luding, tributary of Dadu He, 29°53'N, 102°13'E, 1250 m, river bank, 21.VI.1999, leg. Wrase (cSch); 1♂, Daxue Shan, Hailuogou Glacier Park, Camp 1, 29°36'N, 102°04'E, 2100 m, 27.–31.V.1997, leg. Schülke (cAss). **Shaanxi:** 5♂♂, 1♀, Qinling Shan, 115 km WSW Xi'an, river bank above Houzhenzi, 33°50'N, 107°47'E, 1450 m, gravel bank, 15.VII.2001, leg.

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Schülke & Wrase (cSch, cAss). **Hubei:** 3♂♂ [2 teneral], Daba Shan, creek valley 8 km NW Muyuping, 31°29'N, 110°22'E, 1540 m, stream bank, 18.VII.2001, leg. Schülke & Wrase (cSch); 5♂♂, 2♀♀ [4 teneral], same data, but 1550–1650 m (cSch).

Redescription. Body length 6.5–7.5 mm; length of forebody 3.4–3.9 mm. Habitus as in Fig. 133. Coloration: head, pronotum, and abdomen black; elytra black, without bluish hue, posteriorly with reddish spot of variable size and coloration, moderately large, bright-reddish, and distinctly contrasting with the remainder of elytral surface to small, dark-reddish and weakly delimited; legs dark-brown to blackish, with reddish tarsi; antennae dark-brown with infuscate antennomere I.

Head (Fig. 134) approximately as long as broad, usually slightly narrowed behind eyes; posterior angles broadly rounded; punctation of dorsal surface coarse and moderately dense, in median dorsal portion somewhat sparser (but not impunctate); interstices without microsculpture. Eyes moderately large and prominent, usually slightly more than half as long as distance from posterior margin of eye to neck. Antenna 1.7–2.0 mm long.

Pronotum (Fig. 134) approximately 1.25 times as long as broad and approximately as wide as head, lateral margins straight in the middle and weakly converging posteriad in dorsal view; punctation similar to that of head or slightly coarser.

Elytra (Fig. 134) moderately long, 0.90–0.95 times as long as pronotum; humeral angles marked; punctation coarse, dense, and arranged in somewhat irregular series; interstices without microsculpture and glossy. Hind wings fully developed.

Abdomen approximately as wide as elytra; punctation fine and dense; interstices with fine microsculpture; posterior margin of tergite VII with palisade fringe; tergite VIII without sexual dimorphism, posterior margin weakly convex to indistinctly angled in the middle.

♂: sternites V–VI unmodified; sternite VII with shallow median impression with sparse pubescence posteriorly, posterior margin broadly concave (Fig. 135); sternite VIII weakly transverse, posteriorly with distinct median impression, this impression with numerous modified, short and stout black setae, posterior margin of distinctive shape: distinctly asymmetric and with tooth-like projection on either side of the small sub-median excision (Figs 136–137); aedeagus approximately 1.5 mm long, ventral process conspicuously long, asymmetric, and of distinctive shape (Figs 138–139).

Comparative notes. This species is characterised particularly by the shape of the male sternite VIII and the conspicuous morphology of the ventral process of the aedeagus. It is additionally distinguished from the widespread *L. hongkongense* by the coloration (absence of a bluish hue) and length of the elytra (distinctly shorter than pronotum).

Distribution and natural history. This species is currently known from Sichuan, Shaanxi, and Hubei provinces (Fig. 140), where it was found on banks of rivers and streams at altitudes of 1250–2800 m. Several specimens collected in July are teneral.

Lobrathium hebeatum Zheng, 1988 (Figs 142–147, 153)

Lobrathium hebeatum Zheng, 1988: 189 f.

Comment. The original description is based on 16 type specimens from four localities in Sichuan (Zheng 1988). The types were not examined, but, based on the illustrations and descriptive details provided by Zheng (1988), there is no doubt that the material listed below is conspecific with the holotype.

Material examined. China: Sichuan: 5♂♂, 1♀, Daxue Shan, river valley 5 km E Kangding, 30°03'N, 102°00'E, 2500–2800 m, 20.–23.V.1997, leg. Wrase (cSch, cAss); 7♂♂, 1♀, Ganzi Tibet. Aut. Pref., Kangding Co., Daxue Shan, stream valley 5 km E Kangding, 30°03'N, 102°00'E, 2500–2600 m, 24.VI.1999, leg. Wrase (cSch, cAss); 1♀, Daxue Shan, 10 km S Kangding, 29°59'N, 101°55'E, 3150 m, river valley, 25.V.1997, leg. Wrase (cSch). **Shaanxi:** 1♂, 1♀ [teneral], Qinling Shan, 47 km S Xi'an, autoroute km 70, mountain W pass, 33°51'N, 108°47'E, 2300–2500 m, 26.–29.VIII.1995, leg. Wrase & Schülke (cSch). **Yunnan:** 1♂, 1♀, Dali Bai Nat. Aut. Pref., Diancang Shan, 5 km SSW Dali old town, creek valley above cable car, 25°39'N, 100°08'E, 2800 m, 26.VIII.2003, leg Schülke (cSch).

Redescription. Body length 6.5–7.5 mm; length of forebody 3.5–4.0 mm. Habitus as in Fig. 142. External morphology as in *L. tortile* (Figs 142–143), except as follows:

Antenna longer and more slender, 2.0–2.2 mm long.

♂: sternites III–VI with long, narrow, and glossy median keel; sternite VII with large and distinct median impression, this impression with numerous distinctly modified, short and stout black setae, posterior margin distinctly and broadly concave (Fig. 144); sternite VIII weakly transverse, with distinct median impression, this impression with numerous modified, short and stout black setae, posterior excision conspicuously deep and U-shaped (Fig. 145); aedeagus approximately 1.2 mm long, ventral process straight, with distinct ventral teeth, and apically of distinctive shape, particularly in ventral view (Figs 146–147).

Comparative notes. This species is characterised particularly by the presence of median keels on the male sternites III–VI (unique), the shape and chaetotaxy of the male sternite VII and VIII, as well as by the distinctive shape of the ventral process of the aedeagus.

Distribution and natural history. *Lobrathium hebeatum* is currently known from Sichuan, Shaanxi, and Yunnan provinces (Fig. 153), where it was found on banks of rivers

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Fig. 153. Distributions of *Lobrathium* species in China: *L. configens* (open diamonds); *L. retrocarinatum* (filled square); *L. gladiatum* (filled circle); *L. radens* (open square); *L. hebeatum* (triangles), based on revised records (filled triangles) and a literature record by Zheng (1988) (open triangle).

and streams at altitudes of 2500–3150 m, in one locality together with *L. hongkongense*. Teneral adults were collected in August.

Lobrathium gladiatum Zheng, 1988 (Figs 148–153)

Lobrathium gladiatum Zheng, 1988: 190.

Comment. The original description is based on a unique holotype from Qingcheng Shan in Sichuan. This specimen was not examined, but, based on the illustrations and descriptive details provided by Zheng (1988), there is no doubt that the material listed below, all of which was collected in the Qingcheng Shan, is conspecific with the holotype.

Material examined. China: Sichuan: 3♂♂, 1♀ [partly teneral], Qingcheng Shan, NW Chengdu, 30°54'N, 103°32'E, 650–700 m, 3.–4.VI.1997, leg. Schülke (cSch); 4♂♂, 3♀♀, Wenjiang Distr., Dujiangyan Co., Qingcheng Shan, 56 km NW Chengdu, 30°54'N, 103°32'E, 975 m, stream bank, 975 m, 18.VI.1999, leg. Schülke (cSch, cAss).

Description. Body length 5.8–6.8 mm; length of forebody 3.2–3.6 mm. Habitus as in Fig. 148. Coloration: head, pronotum, and abdomen black; elytra black, without bluish hue, posteriorly with moderately large reddish-yellow spot reaching posterior, but not lateral margins; legs reddish-brown with reddish tarsi, usually at least the profemora infuscate; antennae dark-reddish, antennomere I not infuscate.

Head (Fig. 149) weakly oblong, widest across eyes, narrowed behind eyes; posterior angles broadly rounded; punctation of dorsal surface coarse and moderately dense, in median dorsal portion somewhat sparser (but not impunctate); interstices without microsculpture. Eyes large and prominent, slightly more than half as long as distance from posterior margin of eye to neck. Antenna 1.9–2.0 mm long.

Pronotum (Fig. 149) slender, 1.30–1.35 times as long as broad and slightly narrower than head, lateral margins indistinctly convex in the middle and weakly converging posteriad in dorsal view; punctation similar to that of head.

Elytra (Fig. 149) moderately long, approximately as long as pronotum; humeral angles marked; punctation coarse, dense, and arranged in somewhat irregular series; interstices without microsculpture and glossy. Hind wings fully developed.

Abdomen usually slightly narrower than, more rarely approximately as wide as elytra; punctation fine and dense; interstices with fine microsculpture; posterior margin of tergite VII with palisade fringe; tergite VIII without pronounced sexual dimorphism, posterior margin on average slightly more strongly convex in female than in male.

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♂: sternites V and VI with shallow median impressions; sternite VII with pronounced, deep and extensive median impression (Fig. 150); sternite VIII with pronounced impression posteriorly, on either side of impression and of posterior excision strongly bulging, almost carinate, posterior excision very deep and broad (Fig. 151); aedeagus 0.9–1.0 mm long, ventral process with very thin base and with pronounced median carina dorsally (Fig. 152).

Comparative notes. This species is characterised particularly by the shape and chaetotaxy of the male sternite VIII and the conspicuous morphology of the ventral process of the aedeagus. It is additionally distinguished from the externally similar *L. hebeatum* and *L. tortile* by the more slender head and pronotum, and by the longer elytra.

Distribution and natural history. This species is currently known only from the Qingcheng Shan in central Sichuan province, China (Fig. 153). The recently collected material was found at an altitude of 650–975 m, the holotype at 1600 m. Teneral adults were observed in June.

Lobrathium emeiense Zheng, 1988

Lobrathium emeiense Zheng, 1988: 191.

Comment. The original description is based on a unique female holotype from the Emei Shan, Sichuan. Since a reliable identification and interpretation of the vast majority of *Lobrathium* species is possible only based on the male sexual characters, the identity of this species must remain doubtful at least until males from the vicinity of the type locality become available.

Lobrathium configens sp. n. (Figs 153–165)

Type material. Holotype ♂: "China (S-Shaanxi) Qinling Shan, river bank above Houzhenzi, 115 km WSW Xi'an, 1450 m, 33°50'N, 107°47'E (coarse gravel bank with plants and leaves) 4.VII.2001 Wrase [06a] / Holotypus ♂ *Lobrathium configens* sp. n., det. V. Assing 2011" (NHMW). Paratypes: 2♂♂, 2♀♀ [partly teneral]: "China: Sichuan Gongga Shan, Hailuogou, in front of Glacier 1, 2850 m, 29°35N, 102°00E, 7.VII.1998, A. Smetana [C76] / 1998 China Expedition J. Farkač, D. Král, J. Schneider & A. Smetana" (cSme, cAss); 1♂ [slightly teneral]: "China W.Sichuan (Ganzi Tibet. Aut. Pref., Yajiang Co.), Shalui Shan, river valley 6 km WSW Yajiang, 3250 m, 30°01N, 100°57E (river bank, bank slope), 4.VII.1999 D.W. Wrase" (cSch); 1♂ [slightly teneral]: "China: S-Sichuan 1999, Ya'an Prefecture, Shimian Co., Xiaoxiang Ling, Pass zw. Shimian u. Ganluo, 27 km SE Shimian, 29°03N, 102°31E, 2450 m, Quellsumpf, Bachufer, 8.VII., leg. M. Schülke (cSch); 1♀: "China S.Sichuan (Ya'an Pref., Shimian Co.) Xiaoxiang Ling, road Shimian-Ganluo, 20 km SE Shimian (bank limit), 29°05N, 102°29E, 1850 m, 8.VII.1999 D.W. Wrase" (cSch); 4♂♂, 3♀♀: "China: W-Hubei, 2002, Dashenongjia mts., 2100–2900 m, 10.–14.6., 31.5N, 110.3E, leg. J. Turna" (NHMW, cAss); 1♂: "China, Yunnan prov., 18.6.–4.7.1993, Heishui=35 km N Lijiang, 27,13 N, 100,19 E, lgt. S. Becvar" (NHMW); 1♂, 5♀♀ [partly teneral]: "China, Yunnan prov., 1.–19.7.1992, Heishui, 35 km N Lijiang, 27,13N, 100,19E, lgt. S. Becvar" (NHMW, cAss); 1♀: same data, but 27.–28.VI.1992 (NHMW); 2♂♂ [1 teneral]: "China (N-Yunnan), Zhongdian Co., 16 km SSE Zhongdian, 3100 m, 27°40.7'N, 99'°44.2'E (river bank, gravel), 17.VIII.2003 Wrase [06]" (cSch); 1♂, 3♀♀: "China (N-Yunnan) Diqing Tibet. Aut. Pref., Deqin Co., Meili Xue Shan, E-side, 14 km W Deqin, 28°27.47'N, 98°46.35'E, 2700 m / small creek valley, glacier outlet (under stones and gravel along glacier stream) 11.VI.2005 D.W.Wrase [09A]" (cSch, cAss).

Etymology. The specific epithet (Latin, present participle of configere: to sting) refers to the long and acute ventral process of the aedeagus.

Description. Body length 6.0–7.2 mm; length of forebody 3.6–4.0 mm. Habitus as in Fig. 155. Coloration: head, pronotum, and abdomen black; elytra black with bluish hue, posterior third with yellowish spot reaching posterior and lateral margins; legs blackish with dark-reddish tarsi; antennae dark-brown.

Head (Fig. 156) approximately as long as broad, widest across eyes, somewhat narrowed behind eyes; posterior angles broadly rounded; punctation of dorsal surface coarse and moderately dense, in median dorsal portion somewhat sparser (but not impunctate); interstices without microsculpture. Eyes large and prominent, more than half as long as distance from posterior margin of eye to neck. Antenna 2.0–2.2 mm long.

Pronotum (Fig. 156) slender, approximately 1.3 times as long as broad and 0.90–0.95 times as broad as head, lateral margins almost straight and weakly converging posteriad in dorsal view; punctation similar to that of head.

Elytra (Fig. 156) long, approximately 1.1 times as long as, and distinctly broader than pronotum; humeral angles marked; punctation coarse, dense, and arranged in somewhat irregular series; interstices without microsculpture and glossy. Hind wings fully developed.

Abdomen distinctly narrower than elytra; punctation fine and dense; posterior margin of tergite VII with palisade fringe; tergite VIII without sexual dimorphism, posterior margin strongly convex to obtusely pointed in both sexes.

♂: sternite V with small and very shallow median impression posteriorly; sternite VI with shallow median impression not confined to posterior half; sternite VII with

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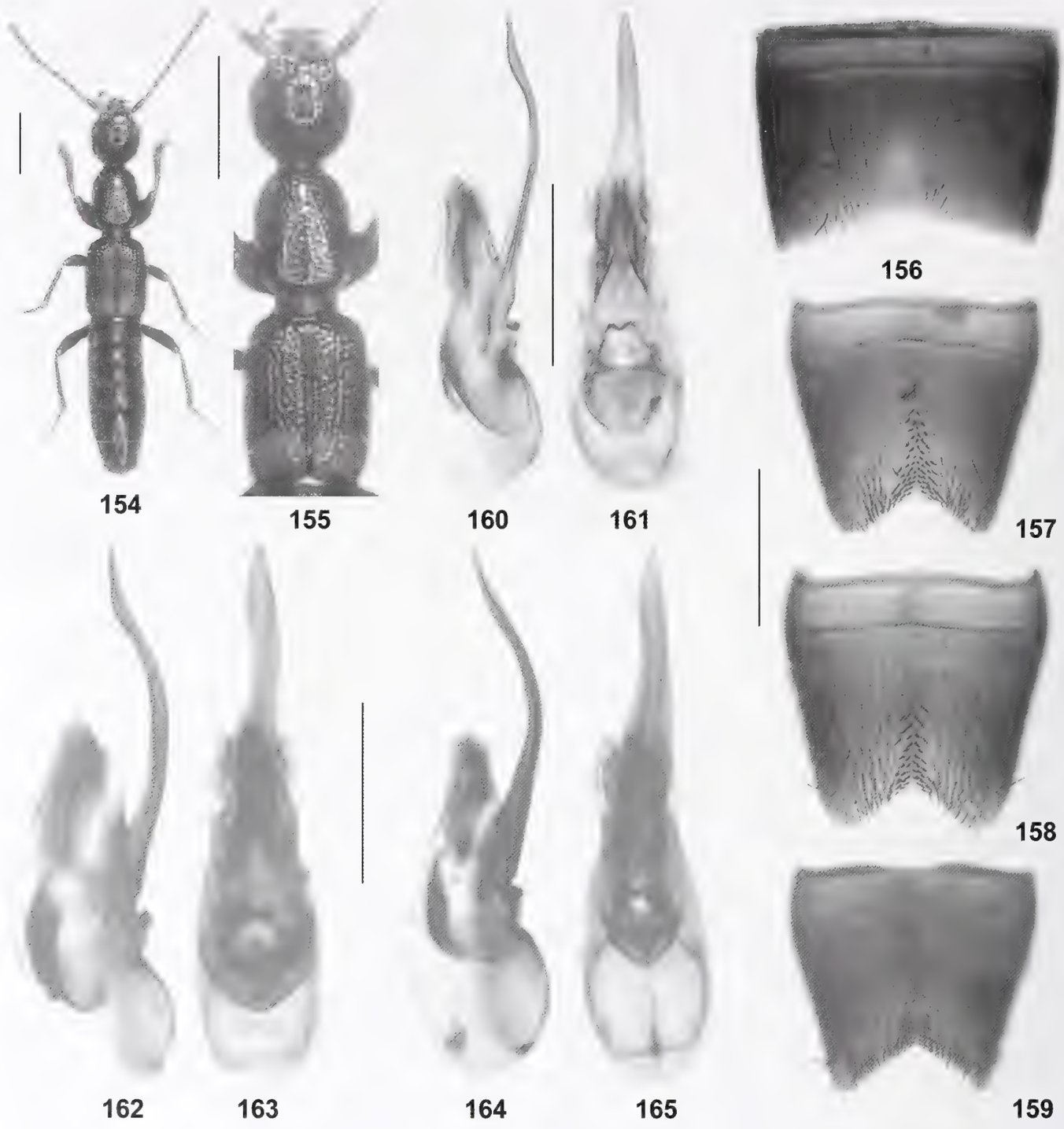

Figs 154–165. *Lobrathium configens*. **154:** habitus; **155:** forebody; **156:** male sternite VII; **157–159:** sternite VIII of males from Shaanxi (**157**), Hubei (**158**), and Yunnan (**159**); **160–165:** aedeagus in lateral and in ventral view of males from Shaanxi (**160–161**), Hubei (**162–163**), and Yunnan (**164–165**). Scale bars: 154–155: 1.0 mm; 156–165: 0.5 mm.

moderately deep median impression posteriorly, this impression without pubescence, posterior margin broadly concave (Fig. 156); sternite VIII weakly transverse, posteriorly with median impression of triangular shape, this impression with numerous modified, short and stout black setae, posterior excision broad and not very deep, on either side of this impression with dense black setae (Figs 157–159); aedeagus of variable size, 1.3–1.5 mm long, ventral process of somewhat variable shape, long, slender, dorso-ventrally flattened, apically acute, almost symmetric to distinctly asymmetric, and dorso-ventrally flattened.

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Intraspecific variation. The ventral process of the aedeagus of this species is remarkably variable. This particularly applies to the degree of asymmetry, the degree to which it is twisted apically, and to the width of the base (ventral aspect) (Figs 160–165). Also, to a lesser extent, the chaetotaxy of the male sternite VIII is somewhat variable (Figs 157–159). However, in view of the general character divergence in *Lobrathium* species and the presence of transitional conditions, the observed differences are attributed to intra- rather than interspecific variation.

Comparative notes. In external characters, *L. configens* is highly similar to the widespread *L. hongkongense*, but distinguished from this species by the male primary and secondary sexual characters, especially the completely different shape of the ventral process of the aedeagus.

Distribution and natural history. The type specimens were collected in several localities in Shaanxi, Sichuan, Hubei, and Yunnan provinces (Fig. 153) at altitudes of 1450–3250 m. At least part of the type specimens was found on stream banks. The specimens from the Gongga Shan were found in sandy areas near a river leaving a glacier (Smetana pers. comm.) together with *L. daxuense*. Teneral adults were repeatedly observed in July and once in August. The holotype was collected together with numerous specimens of *L. tortile*.

***Lobrathium spathulatum* sp. n.** (Figs 166–173, 180)

Type material. Holotype ♂: "China – Sechuan, Pingwu, 2.6.–4.6.2001, lgt. E. Kučera / Holotypus ♂ *Lobrathium spathulatum* sp. n., det. V. Assing 2011" (cAss). Paratypes: 1♂, ♀: "China c. 25.V., Xiexian [=Xiaxian], 111,6'–34,8' [sic], 20 km NE Yuncheng, leg. J. Halada 1996" (NHMW, Ass); 1♂ [slightly teneral]: "E-China: Zhejiang, Gutianshan National Nature Reserve, 13.–18.III.2008, leg. Th. Assmann" (cFel); 1♂: "China-Shaanxi, Lüeang, 22.5.–25.5.2000, lgt. E. Kučera (cFel); 1♀: "China-N.Sechuan, Wangcang, 18.–20.5.2002, lgt. E. Kučera" (cFel); 1♂ [teneral], 1♀: "China: Sichuan (18), Qingcheng-Shan, NW Chengdu, 600 m, Flussufer, 30.55N, 103.30E, 4.06.1997, M. Schülke" (cSch, cAss); 1♂: "China: W-Hubei (Daba Shan), creek valley 8 km NW Muyuping, 31°29'N, 110°22'E, 1550–1650 m, 18.VII.2001, leg. M. Schülke [C01–16A]" (cSch).

Etymology. The specific epithet (Latin, adjective derived from the noun spathula: spattle, applicator) alludes to the shape of the ventral process of the aedeagus.

Description. Body length 6.0–8.0 mm; length of forebody 3.7–4.5 mm. Habitus as in Fig. 166. Coloration: head, pronotum, and abdomen black; elytra black with bluish hue, posterior third with yellowish spot reaching posterior, but not lateral margins; legs blackish with dark-reddish tarsi and reddish-brown tibial bases; antennae dark-brown with blackish antennnomere I.

Head (Fig. 167) approximately as long as broad and of variable shape; temples behind eyes subparallel or converging posteriad; posterior angles broadly rounded; punctation of dorsal surface coarse and moderately dense, in median dorsal portion somewhat sparser (but not impunctate); interstices without microsculpture. Eyes large and prominent, more than half as long as distance from posterior margin of eye to neck. Antenna 2.2–2.5 mm long.

Pronotum (Fig. 167) slender, approximately 1.3 times as long as broad and 0.90–0.95 times as broad as head, lateral margins almost straight and subparallel in dorsal view; punctation similar to that of head.

Elytra (Fig. 167) long, approximately 1.1 times as long as, and distinctly broader than pronotum; humeral angles marked; punctation coarse, dense, and arranged in somewhat irregular series; interstices without microsculpture and glossy. Hind wings fully developed.

Abdomen distinctly narrower than elytra; punctation fine and dense; posterior margin of tergite VII with palisade fringe; tergite VIII without sexual dimorphism, posterior margin strongly convex in both sexes.

♂: sternite VI, sometimes also sternites IV–V, with small median impression posteriorly; sternite VII moderately transverse, with shallow median impression of triangular shape posteriorly, this impression without pubescence, posterior margin broadly and not very deeply concave (Fig. 168); sternite VIII weakly transverse, with long and not very extensive median impression, this impression with numerous modified, stout and short black setae, posterior excision broad and moderately deep, margins of excision with dense black setae (Fig. 169); aedeagus 1.6–1.8 mm long, ventral process long, slender, apically acute, distinctly asymmetric, and somewhat twisted.

Comparative notes. As can be inferred from the similarly derived shape and chaetotaxy of the male sternite VIII, from the similar general morphology of the aedeagus, as well as from the similar external characters, *L. spathulatum* is closely allied to *L. configens*. It is distinguished from this species by larger size (no overlap), the smaller elytral spot (not reaching lateral margins), and by the distinctly larger aedeagus with a ventral process of somewhat different shape.

Distribution. *Lobrathium spathulatum* is currently known from several localities in Sichuan, Shaanxi, Shanxi, Hubei, and Zhejiang (Fig. 180), suggesting that the species is widespread at least in China. Two specimens were collected on a river bank. One teneral male was found in March, another in early June.

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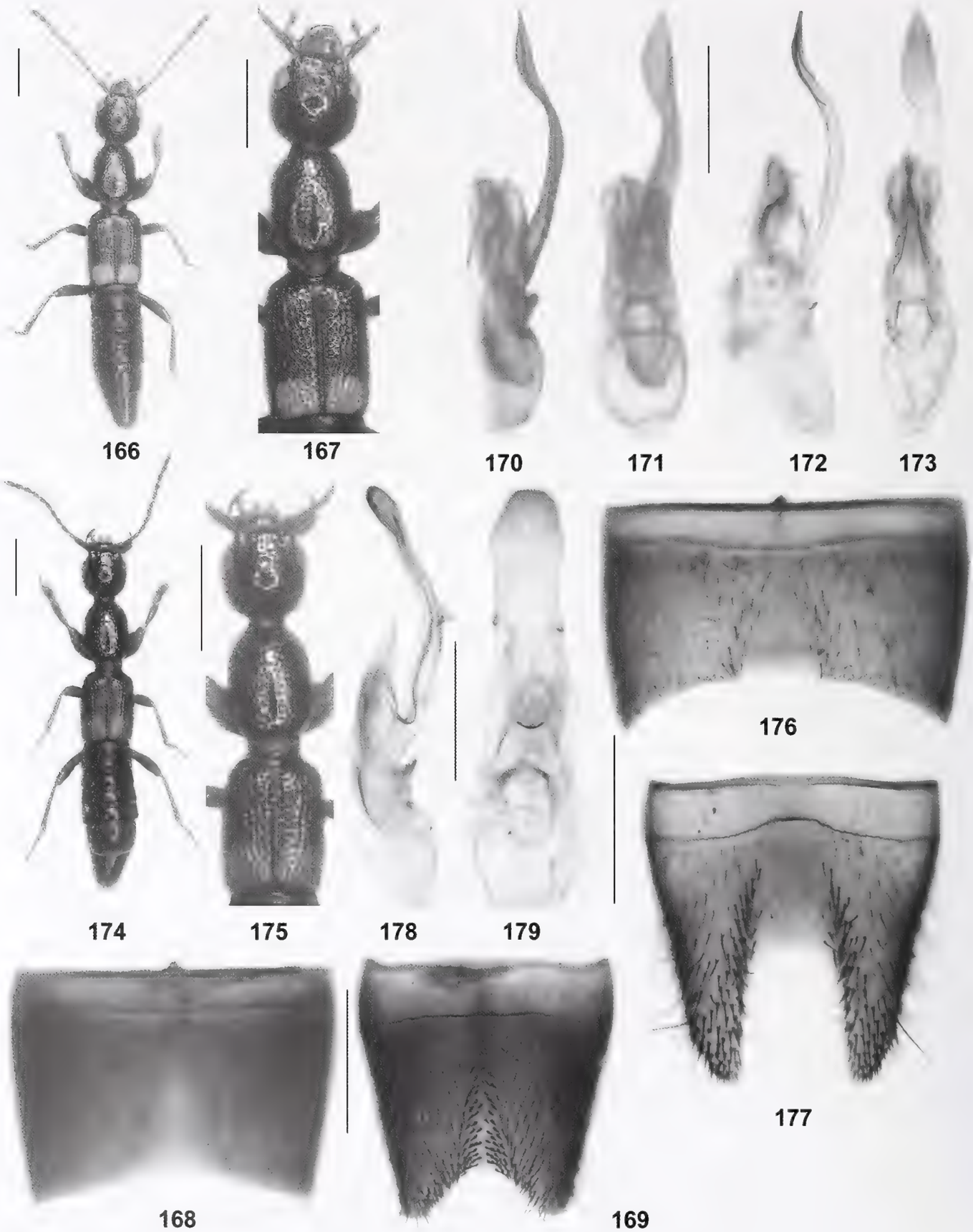

Figs 166–179. *Lobrathium spathulatum* (**166–173**) and *L. bispinosum* (**174–179**). **166, 174:** habitus; **167, 175:** forebody; **168, 176:** male sternite VII; **169, 177:** male sternite VIII; **170–173, 178–179:** aedeagus in lateral and in ventral view (**170–171**: male from Sichuan; **172–173**: male from Shaanxi). Scale bars: 166–167, 174–175: 1.0 mm; 168–173, 176–179: 0.5 mm.

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***Lobrathium bispinosum* sp. n.** (Figs 141, 174–179)

Type material. Holotype ♂ [slightly teneral]: "China: Guizhou, Leishan Co., SE Kaili, 15 km E Leishan, Leigong Shan, S-slope, 26°22.40'N, 108°08.83'E / 12.6.2001, ca. 1000 m, leg. Schillhammer & Wang (CWBS 431) / Holotypus ♂ *Lobrathium bispinosum* sp. n., det. V. Assing 2011" (NHMW). Paratypes: 3♀♀ [partly slightly teneral]: same data as holotype (NHMW, cAss); 1 ex. [abdomen heavily damaged]: "China: Guizhou, Leishan Co., SE Kaili, NE Leishan, Leigong Shan, SE-slope, 26°21.42'N, 108°09.36'E / 21.6.2001, ca. 1200 m, nr. Park gate, leg. Wang (15)" (NHMW).

Etymology. The specific epithet (Latin, adjective: with two spines) alludes to the pair of spines on the ventral process of the aedeagus.

Description. Body length 6.0–6.5 mm; length of forebody 3.5–3.8 mm. Habitus as in Fig. 174. Coloration: body black, posterior third of elytra with yellowish spot reaching posterior and lateral margins; legs reddish (teneral?) to blackish with dark-reddish tarsi; antennae reddish-brown to dark-brown, antennomere I infuscate.

Head (Fig. 175) approximately as long as broad, widest across eyes, behind eyes convexly tapering towards neck, posterior angles obsolete; punctation of dorsal surface coarse and moderately dense, in median dorsal portion somewhat sparser (but not impunctate); interstices without microsculpture. Eyes large and prominent, slightly more than half as long as distance from posterior margin of eye to neck. Antenna 1.9–2.2 mm long.

Pronotum (Fig. 175) slender, approximately 1.35 times as long as broad and 0.95 times as broad as head, lateral margins in the middle almost straight and subparallel in dorsal view; punctation similar to that of head.

Elytra (Fig. 175) moderately long and of somewhat variable length, 0.9–1.0 times as long as, and distinctly broader than pronotum; humeral angles marked; punctation coarse, dense, and arranged in somewhat irregular series; interstices without microsculpture and glossy. Hind wings apparently fully developed.

Abdomen distinctly narrower than elytra; punctation fine and dense, finer and sparser on posterior than on anterior tergites; posterior margin of tergite VII with palisade fringe; tergite VIII without sexual dimorphism, posterior margin strongly convex to obtusely pointed in both sexes.

♂: sternites III–VI unmodified; sternite VII strongly transverse and with distinct median impression of triangular shape and without pubescence, posterior margin distinctly and broadly concave (Fig. 176); sternite VIII approximately as broad as long, weakly sclerotised (semitransparent) anteriorly, and with pronounced median impression without setae, posterior excision conspicuously deep, broad, and of subrectangular shape, on either side of this excision and of median impression with dense black setae (Fig. 177); aedeagus 1.5 mm long, ventral process symmetric, broad (ventral view), apically rounded (ventral view), and bisinuate (lateral view), in the middle with pair of pronounced tooth-like processes (Figs 178–179).

Comparative notes. *Lobrathium bispinosum* is readily distinguished from all its congeners by the conspicuous morphology of the male sternite VIII and of the aedeagus. From *L. hongkongense*, *L. configens*, and *L. mordens*, it is additionally separated by the absence of a bluish hue on the elytra, as well as by the shorter elytra.

Distribution and natural history. The species is currently known only from two localities in the Leigong Shan in the southeast of Guizhou province, southern China (Fig. 141). The specimens were collected at altitudes of 1000 and 1200 m; some of them are teneral.

***Lobrathium demptum* sp. n.** (Figs 180, 271–275)

Type material. Holotype ♂: "China: E - Hubei, Dabie Shan, Wujiashan Forest Park, 31.1 N 115.8 E, 17.–18.6.2003, leg. J. Turna / Holotypus ♂ *Lobrathium demptum* sp. n., det. V. Assing 2012" (NHMW). Paratypes: 1♂, 1♀: same data as holotype (NHMW, cAss).

Etymology. The specific epithet (past participle of the Latin verb demere: to take away) alludes to the small number of modified setae on the male sternite VIII.

Description. Body length 6.3–7.0 mm; length of forebody 3.6–3.9 mm. Coloration: body black, without bluish hue, elytra posteriorly with relatively large yellowish spot reaching posterior and lateral margins; legs dark-brown with reddish tarsi; antennae reddish with infuscate antennomere I.

Head (Fig. 271) approximately as long as broad, widest across eyes, behind eyes convexly tapering towards neck, posterior angles obsolete; punctation of dorsal surface coarse and moderately dense, in median dorsal portion somewhat sparser (but not impunctate); interstices without microsculpture. Eyes large and prominent, slightly more than half as long as distance from posterior margin of eye to neck. Antenna 2.0–2.2 mm long.

Pronotum (Fig. 271) moderately slender, approximately 1.25–1.30 times as long as broad and 0.95–1.00 times as broad as head, lateral margins weakly convex in the middle and slightly converging in dorsal view; punctation similar to that of head.

Elytra (Fig. 271) approximately 0.95 times as long as, and distinctly broader than pronotum; humeral angles marked; punctation coarse, dense, and arranged in some-

Fig. 180. Distributions of *Lobrathium* species in China: *L. excisissimum* (filled square); *L. lamellatum* (open diamond); *L. daxuense* (filled circles); *L. spathulatum* (open triangles); *L. schuelkei* (filled diamond); *L. demptum* (filled triangle).

what oblique series; interstices without microsculpture and glossy. Hind wings apparently fully developed.

Abdomen distinctly narrower than elytra; punctation fine and moderately dense; interstices without appreciable microsculpture and glossy, posterior margin of tergite VII with palisade fringe; tergite VIII without sexual dimorphism, posterior margin broadly convex in both sexes.

♂: sternites III–VI unmodified; sternite VII strongly transverse and with shallow median impression posteriorly, pubescence unmodified, posterior margin distinctly and broadly concave (Fig. 272); sternite VIII approximately as broad as long, median impression long and broad, anteriorly and posteriorly with few modified, short and stout black setae, posterior excision moderately broad and not very deep (Fig. 273); aedeagus 1.4 mm long, ventral process symmetric, large (ventral view) and long, somewhat domed and with short median spine ventrally (Figs 274–275).

Comparative notes. *Lobrathium demptum* is readily distinguished from all its congeners particularly by the shape and chaetotaxy of the male sternites VII and VIII, as well as by the distinctive morphology of the ventral process of the aedeagus. From *L. hongkongense*, *L. configens*, and *L. mordens*, it is additionally separated by the absence of a bluish hue on the elytra, as well as by the shorter elytra.

Distribution and natural history. The type locality is situated in the northeast of Hubei province, very close to the border with Anhui province (Fig. 180). The specimens appear to be slightly teneral. Additional data are not available.

***Lobrathium tuberosum* sp. n.** (Figs 141, 181–186)

Type material. Holotype ♂ [teneral]: "China Jiangxi W Jinggang Shan, Ciping env., 2–14.VI.1994 / Holotypus ♂ *Lobrathium tuberosum* sp. n., det. V. Assing 2011" (NHMW).

Etymology. The specific epithet (Latin, adjective: with tubercles) alludes to presence of minute tubercles on the male sternites IV–VII.

Description. Body length 6.0 mm; length of forebody 3.6 mm. In external characters highly similar to *L. bispinosum* (Fig. 181), reliably distinguished only by the male sexual characters:

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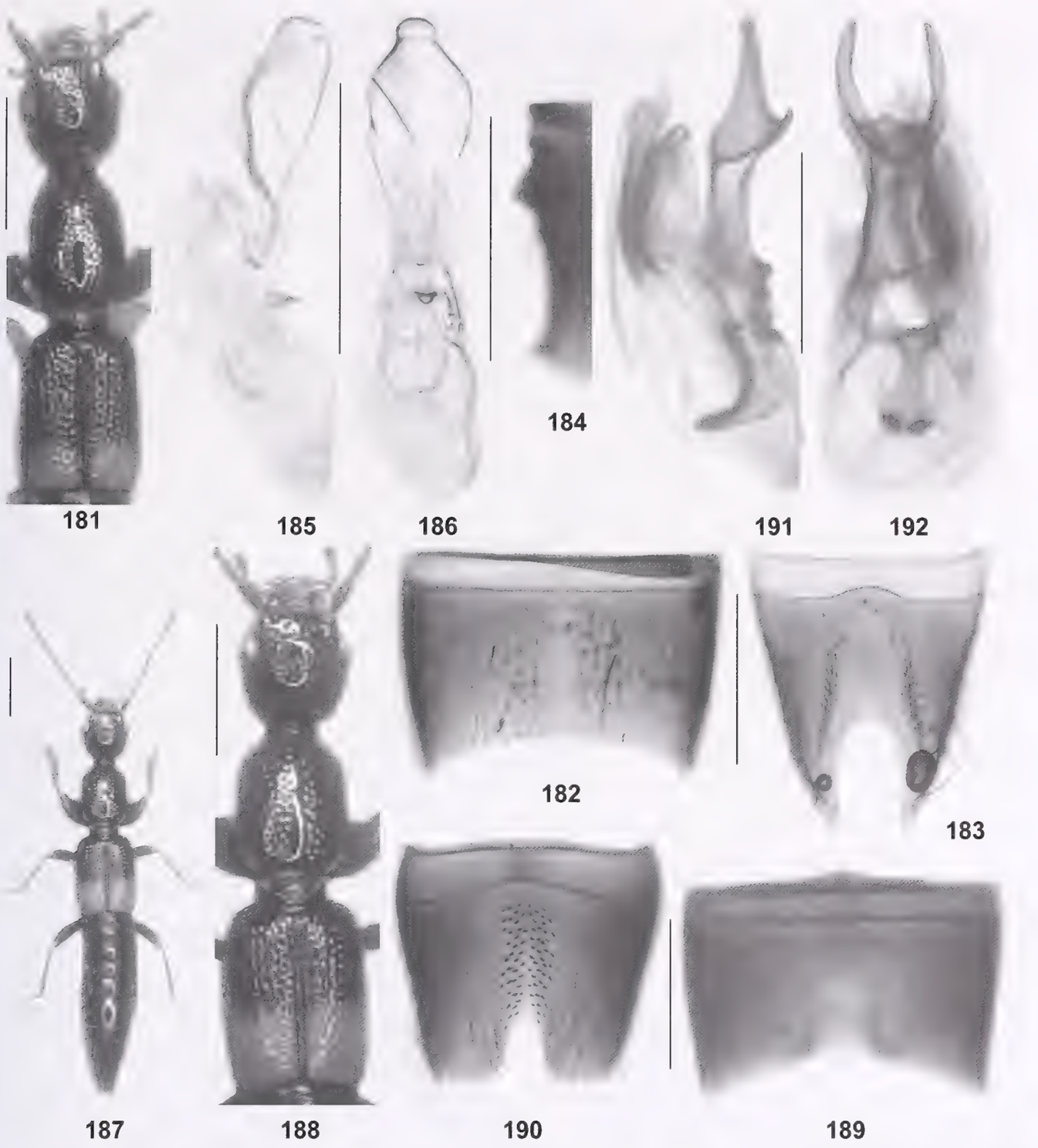

Figs 181–192. *Lobrathium tuberosum* **(181–186)** and *L. taureum* **(187–192). 181, 188:** forebody; **182, 189:** male sternite VII; **183, 190:** male sternite VIII; **184:** male sternite VII in lateral view; **185–186, 191–192:** aedeagus in lateral and in ventral view; **187:** habitus. Scale bars: 181, 187–188: 1.0 mm; 182–186, 189–192: 0.5 mm.

♂: sternites IV–VI with small sharp median tubercle; sternite VII moderately transverse and with extensive median impression, this impression without pubescence in the middle, anterior to impression with tubercle (Fig. 184), posterior margin broadly concave (Fig. 182); sternite VIII oblong, weakly sclerotised (semi-transparent) anteriorly, and with pronounced median impression without setae, posterior excision conspicuously deep, broad, and of subrectangular shape, on either side of this excision and of median impression with dense black setae (Fig. 183); aedeagus 1.2 mm long, ventral process symmetric, conspicuously massive both in lateral and in ventral view, and apically rounded (ventral view) (Figs 185–186).

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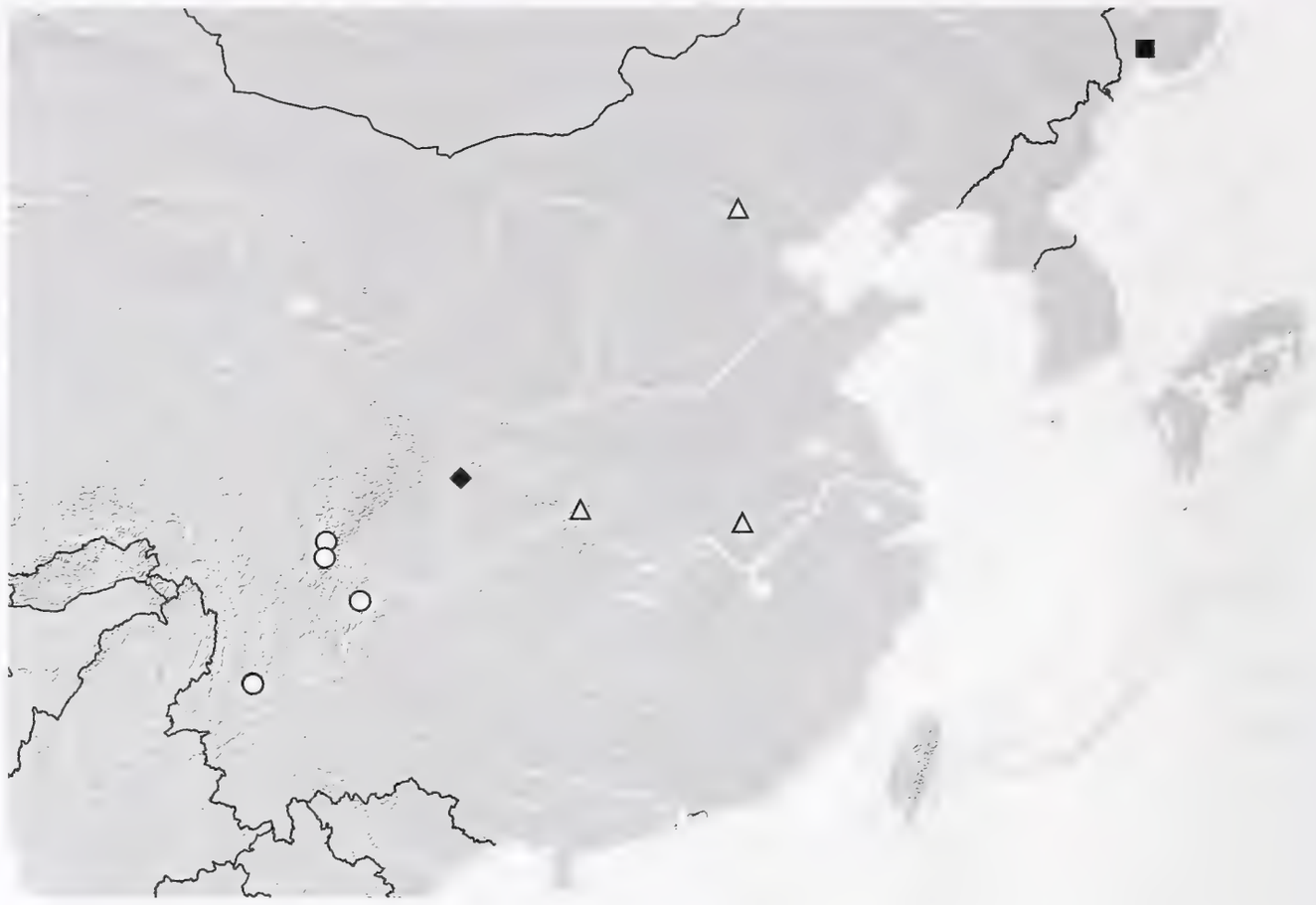

Fig. 193. Distributions of *Lobrathium* species in China and the Russian Far East: *L. duplex* (open circles); *L. feldmanni* (filled diamond); *L. taureum* (open triangles); *L. semiflavum* (filled square).

Comparative notes. *Lobrathium tuberosum* is readily distinguished from all its congeners by the presence of small sharp tubercles on the male sternites IV–VII, the conspicuous morphology of the male sternite VIII, and by the characteristic shape of the ventral process of the aedeagus. The similarly derived shape and chaetotaxy of the male sternite VIII, as well as the similar external characters suggest that *L. tuberosum* is closely allied to *L. bispinosum*.

Distribution and natural history. The type locality is situated in Jiangxi province in southeastern China (Fig. 141). The holotype is teneral.

Lobrathium taureum sp. n. (Figs 187–193)

Type material. Holotype ♂: "China: W-Hubei (Daba Shan), creek valley 8 km NW Muyuping, 31°29'N, 110°22'E, 1550–1650 m, 18.VII.2001, leg. M. Schülke [C01–16A] / creek valley, deciduous forest, moss (sifted) [C01–16A] / Holotypus ♂ *Lobrathium taureum* sp. n., det. V. Assing 2011" (cAss). Paratypes: 17 exs. [partly slightly teneral]: same data as holotype; 1♂: "China: W-Hubei (Daba Shan), creek valley 8 km NW Muyuping, 31°29'N, 110°22'E, 1540 m, 18.VII.2001, moss sifted, leg. M. Schülke [C01–16]" (cSch); 1♂: same data, but leg. D. Wrase (cSch); 6♂♂, 1♀ [1♂ teneral]: China: E-Hubei, Dabie Shan, Wujiashan Forest Park, 31.1 N 115.8 E, 17.–18.6.2003, leg. J. Turna" (NHMW, cAss); 2♂♂, 3♀♀ [previously with type labels "*Lobrathium pekingi*" by V. Gusarov attached to pins, but these labels removed; 1 teneral]: "China: B.M. 1980–491, P.M. Hammond / Peking, Badaling, 9.ix.80" (BMNH, cAss).

Etymology. The specific epithet (Latin, adjective derived from taurus: bull) alludes to the conspicuous shape of the ventral process of the aedeagus.

Description. Body length 6.5–7.8 mm; length of forebody 3.7–4.3 mm. Habitus as in Fig. 187. Coloration: head, pronotum, and abdomen black; elytra black, usually with faint bluish hue and with almost all of posterior half completely (including lateral parts and margins) yellowish;

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legs blackish-brown with pale-reddish tarsi; antennae reddish to dark-brown, antennomere I infuscate.

Head (Fig. 188) approximately as long as broad, widest across eyes, behind eyes convexly tapering towards neck, posterior angles obsolete or nearly so; punctation of dorsal surface coarse and rather dense, in median dorsal portion and on frons distinctly sparser; interstices without microsculpture. Eyes large and prominent, more than half as long as distance from posterior margin of eye to neck. Antenna 2.0–2.3 mm long.

Pronotum (Fig. 188) approximately 1.25 times as long as broad and approximately as broad as head (or nearly so), lateral margins in the middle almost straight and subparallel or weakly converging in dorsal view; punctation similar to that of head, but less dense than in lateral dorsal portions of head.

Elytra (Fig. 188) 1.05–1.10 times as long as, and distinctly broader than pronotum; humeral angles marked; punctation coarse, dense, and arranged in somewhat irregular series; interstices without microsculpture and glossy. Hind wings fully developed.

Abdomen distinctly narrower than elytra; punctation fine and dense, finer and sparser on posterior than on anterior tergites; posterior margin of tergite VII with palisade fringe; tergite VIII without distinct sexual dimorphism, posterior margin slightly more convex in female than in male.

♂: sternites V–VI with shallow median impression posteriorly; sternite VII strongly transverse and with distinct median impression with pubescence, posterior margin broadly concave (Fig. 189); sternite VIII transverse, with pronounced long median impression, this impression with numerous modified, short and stout black setae, posterior excision deep and almost V-shaped (Fig. 190); aedeagus 1.2–1.3 mm long, ventral process symmetric and apically with two long processes (Figs 191–192).

Comparative notes. *Lobrathium taureum* is characterised particularly by the coloration pattern of the elytra and by the distinctive shape of the ventral process of the aedeagus. It shares the elytral coloration only with *L. schuelkei*, with *L. semiflavum* (Russian Far East), and with *L. partitum* (Japan).

Distribution and natural history. The species is currently known from the Daba Shan (altitude 1540–1650 m) and the Dabie Shan in Hubei province, as well as from Beijing province, China (Fig. 193). Teneral specimens were collected in June, July, and September.

Lobrathium schuelkei sp. n. (Figs 180, 194–199)

Type material. Holotype ♂ [teneral]: "China (S-Shaanxi) Qinling Shan, river bank above Houzhenzi, 115 km WSW Xi'an, 1450 m, 33°50'N, 107°47'E (coarse gravel bank with plants and leaves) 4.VII.2001 Wrase [06a] / Holotypus ♂ *Lobrathium schuelkei* sp. n., det. V. Assing 2011" (cAss).

Etymology. The species is dedicated to my friend and colleague Michael Schülke, whose most remarkable material from China, which included also the holotype of this species, represented a major, invaluable contribution to the present paper.

Description. Body length 7.8 mm; length of forebody 4.2 mm. In external characters practically identical to *L. taureum* (Figs 194–195), distinguished only by the male sexual characters:

♂: sternites V–VI with shallow median impression posteriorly; sternite VII strongly transverse and with distinct median impression with pubescence, posterior margin broadly concave (Fig. 196); sternite VIII weakly transverse, with pronounced long median impression, this impression with numerous modified, short and stout black setae, posterior excision small and almost V-shaped (Fig. 197); aedeagus 1.1 mm long, ventral process symmetric and apically truncate in ventral view (Figs 198–199).

Comparative notes. Among Chinese *Lobrathium*, *L. schuelkei* is most similar to *L. taureum*, from which it is reliably distinguished only by the less deep posterior excision of the male sternite VIII and by the completely different morphology of the aedeagus.

Distribution and natural history. The type locality is situated in the Qinling Shan in the south of Shaanxi province, China (Fig. 180). The somewhat teneral holotype was collected on a gravel bank at an altitude of 1450 m, together with *L. hongkongense* and *L. configens*.

Lobrathium radens sp. n. (Figs 153, 200–205)

Type material. Holotype ♂: "China: Guizhou, Leishan Co., SE Kaili, NE Leishan, Leigong Shan, E-slope, 1700–1800 m, 14.–24.6.2001 / env. of pass between Leishan and Fangxiang (26°22.74'N 108°12.99'E), leg. Schillhammer (7) / Holotypus ♂ *Lobrathium radens* sp. n., det. V. Assing 2011" (NHMW). Paratypes: 2♂♂: same data as holotype (NHMW, cAss).

Etymology. The specific epithet (Latin, present participle of radere: to scrape) alludes to the presence of distinct spines and carinae on the ventral process of the aedeagus.

Description. Large species, body length 8.0–9.2 mm; length of forebody 4.9–5.2 mm. Habitus as in Fig. 200. Coloration: body black, elytra with large yellowish spot

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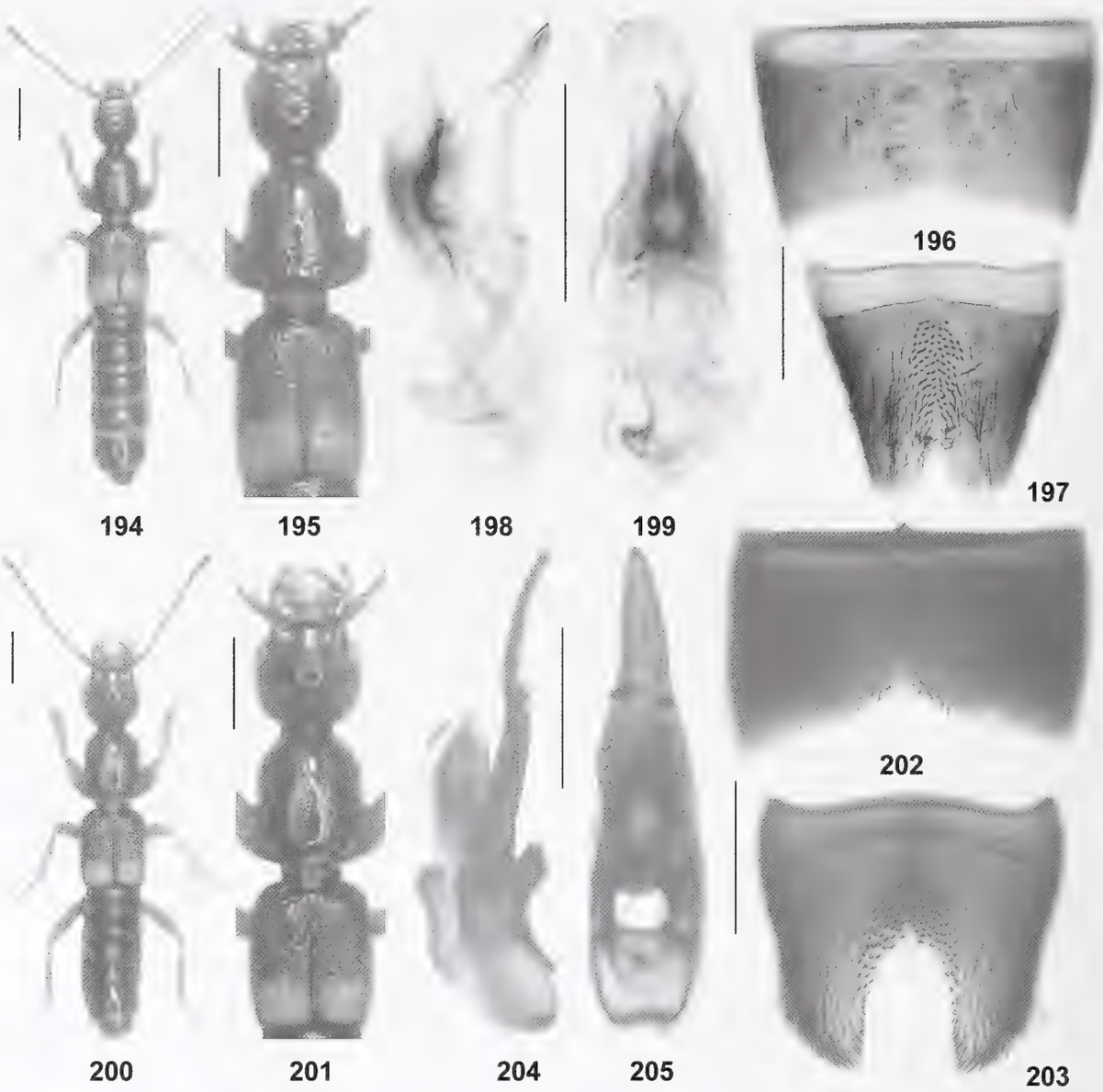

Figs 194–205. *Lobrathium schuelkei* (**194–199**) and *L. radens* (**200–205**). **194, 200:** habitus; **195, 201:** forebody; **196, 202:** male sternite VII; **197, 203:** male sternite VIII; **198–199, 204–205:** aedeagus in lateral and in ventral view. Scale bars: 194–195, 200–201: 1.0 mm; 196–199, 202–205: 0.5 mm.

posteriorly not reaching lateral and posterior margins; legs reddish; antennae dark-reddish to reddish-brown.

Head (Fig. 201) weakly transverse, behind eyes strongly convex; posterior angles weakly marked; punctation of dorsal surface moderately coarse and very dense, with interstices reduced to narrow ridges, small spot in median dorsal portion and frons impunctate and glossy. Eyes moderately large, approximately half as long as distance from posterior margin of eye to neck. Antenna 2.8–3.0 mm long.

Pronotum (Fig. 201) relatively short and broad, approximately 1.15–1.20 times as long as broad and almost as broad as head, lateral margins almost straight in the middle and converging posteriad in dorsal view; punctation sparser and slightly coarser than that of head.

Elytra (Fig. 201) approximately 0.95 times as long as, and distinctly broader than pronotum; humeral angles marked; punctation coarse, dense, and not arranged in series; interstices without microsculpture and glossy. Hind wings fully developed.

Abdomen distinctly narrower than elytra; punctation fine and dense; posterior margin of tergite VII with palisade fringe; posterior margin of tergite VIII weakly convex.

♂: sternites III–VI unmodified; sternite VII with small and V-shaped median impression with cluster of approximately 10 modified, short and stout black setae on either side, posterior margin distinctly and broadly concave (Fig. 202); sternite VIII weakly transverse, with pronounced median impression, this impression with numerous mod-

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ified, short and stout black setae, posterior excision deep, broad, and somewhat U-shaped, on either side of this excision with dense black setae (Fig. 203); aedeagus approximately 1.5 mm long, ventral process blade-shaped and apically acute, on ventral surface with two tooth-like processes and additional tranverse carinae (Figs 204–205).

Comparative notes. *Lobrathium radens* is characterised particularly by its large size, broad body, the dense punctation of the head, the short and broad pronotum, and particularly by the shape and chaetotaxy of the male sternite VII and VIII, as well as by the morphology of the aedeagus.

Distribution and natural history. The type locality is situated in the Leigong Shan in eastern Guizhou province, China (Fig. 153). The type specimens were collected at an altitude 1700–1800 m.

***Lobrathium retrocarinatum* sp. n.** (Figs 153, 206–211)

Type material. Holotype ♂ [teneral]: "China: Yunnan province, Shanzhi env., 22.–24.VI.2007, Jizu Shan Mt., 2180–2580 m, along the path to the summit, 27°57.7–8'N, 100°22.1–23.6'E, J. Hájek & J. Ružička leg. / sifted detritus and leaves, dense mixed forest (with dominant *Pinus*, *Quercus* and *Rhododendron*) near stream [CH45–47] / Holotypus ♂ *Lobrathium retrocarinatum* sp. n., det. V. Assing 2011" (cAss).

Etymology. The specific epithet (Latin, adjective) is composed of retro (back, backwards) and carinatum (carinate); it refers to the long dorsal carina of the ventral process of the aedeagus.

Description. Species of moderate size, body length 7 mm; length of forebody 3.7 mm. Habitus as in Fig. 206. Coloration: whole body blackish, elytra with weak purple hue and with relatively small, circular yellowish spot posteriorly not reaching lateral and posterior margins, nor suture.

Head (Fig. 207) weakly transverse, 1.07 times as wide as long, of subrectangular shape, widest across eyes; posterior angles moderately marked; punctation of dorsal surface coarse and dense; vertex and frons less densely punctate; interstices without microsculpture. Eyes large and bulging, approximately 0.8 times as long as distance from posterior margin of eye to neck in dorsal view. Antenna 2.1 mm long.

Pronotum (Fig. 207) moderately oblong, approximately 1.2 times as long as broad and about 0.95 times as broad as head, lateral margins almost straight in the middle and weakly converging posteriad in dorsal view; punctation similar to that of head.

Elytra (Fig. 207) long, 1.05 times as long as, and distinctly broader than pronotum; humeral angles marked; punctation coarse, dense, and not arranged in distinct series; interstices without microsculpture and glossy. Hind wings fully developed.

Abdomen slightly narrower than elytra; punctation moderately fine and dense; interstices with distinct transverse microsculpture; posterior margin of tergite VII with palisade fringe; posterior margin of tergite VIII weakly convex.

♂: sternites V and VI with shallow median impression posteriorly; sternite VII strongly transverse and with pronounced, extensive median impression, this impression with a cluster of distinctly modified, short and stout black setae on either side of the impunctate middle, posterior margin broadly and distinctly concave (Fig. 208); sternite VIII approximately as long as broad and with pronounced, deep and oblong median impression, this impression with numerous distinctly modified, short and stout black setae, except for the impunctate posterior median portion, posterior excision relatively deep and almost U-shaped, on either side of this excision with dense black setae (Fig. 209); aedeagus 1 mm long, ventral process basally broad, gradually tapering towards apex, apically acute, without distinct spines, but with pronounced, long median carina dorsally (Figs 210–211).

Comparative notes. *Lobrathium retrocarinatum* is distinguished from other spotted *Lobrathium* species particularly by the pronounced modifications of the male sternites VII and VIII, as well as by the distinctive morphology of the ventral process of the aedeagus. From many Chinese representatives of the genus with spotted elytra, it is additionally distinguished by the relatively small and subcircular elytral spots.

Distribution and natural history. The type locality is situated in the Jizu Shan in northern Yunnan, China (Fig. 153). The latitude indicated on the label of the holotype is evidently erroneous and should read 25° rather than 27°. The somewhat teneral type specimen was collected in a mixed forest near a stream at an altitude of 2180–2580 m.

***Lobrathium feldmanni* sp. n.** (Figs 193, 212–217)

Type material. Holotype ♂: "China-N.Sechuan, Wangcang, 18.–20.5.2002, Lgt E Kučera / Holotypus ♂ *Lobrathium feldmanni* sp. n., det. V. Assing 2011" (cAss).

Etymology. The species is dedicated to my friend and colleague Benedikt Feldmann, to whom I owe the holotype.

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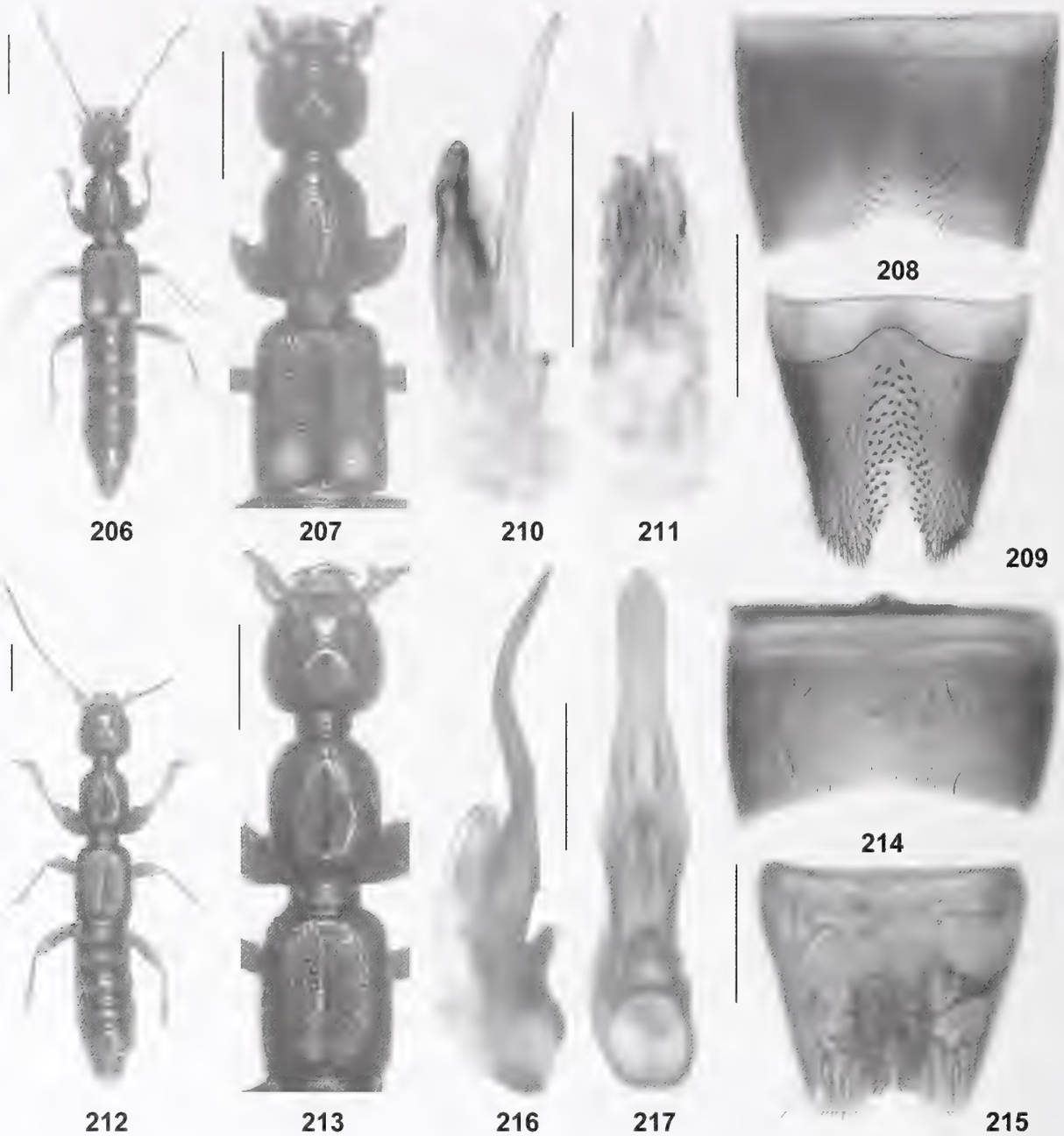

Figs 206–217. *Lobrathium retrocarinatum* (**206–211**) and *L. feldmanni* (**212–217**). **206, 212:** habitus; **207, 213:** forebody; **208, 214:** male sternite VII; **209, 215:** male sternite VIII; **210–211, 216–217:** aedeagus in lateral and in ventral view. Scale bars: 206–207, 212–213: 1.0 mm; 208–211, 214–217: 0.5 mm.

Description. Large species, body length 8.6 mm; length of forebody 4.8 mm. Habitus as in Fig. 212. Coloration: body dark-brown; legs brown; antennae dark-brown.

Head (Fig. 213) approximately as long as wide, behind eyes convexly rounded towards neck; posterior angles not marked; punctation of dorsal surface relatively fine and dense; interstices narrow, narrower than diameter of punctures, and glossy, without microsculpture; transverse patch in median dorsal portion and frons impunctate. Eyes relatively small, approximately one third as long as distance from posterior margin of eye to neck. Antenna slender, 3.2 mm long.

Pronotum (Fig. 213) 1.27 times as long as broad and 0.93 times as broad as head, widest in anterior half, convexly tapering posteriorly; punctation dense, slightly coarser than that of head.

Elytra (Fig. 213) 0.92 times as long as, and distinctly broader than pronotum; humeral angles marked; punctation coarse, dense, and not arranged in series; interstices without microsculpture and glossy. Hind wings apparently fully developed.

Abdomen as broad as elytra; punctation fine and dense; posterior margin of tergite VII with palisade fringe; posterior margin of tergite VIII distinctly convex.

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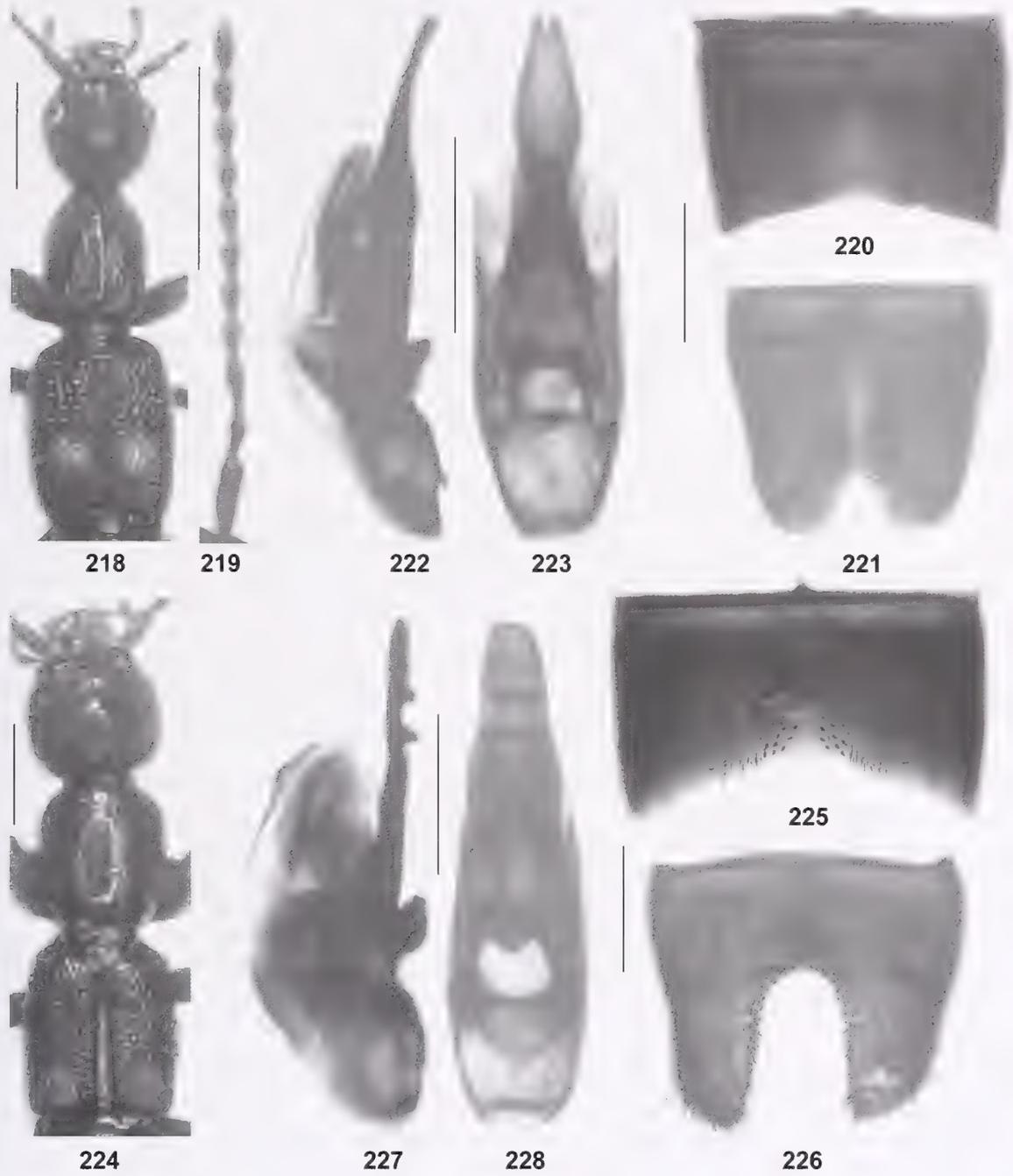

Figs 218–228. *Lobrathium ablectum* (**218–223**) and *L. excisissimum* (**224–228**). **218, 224:** forebody; **219:** antenna; **220, 225:** male sternite VII; **221, 226:** male sternite VIII; **222–223, 227–228:** aedeagus in lateral and in ventral view. Scale bars: 218–219, 224: 1.0 mm; 220–223, 225–228: 0.5 mm.

♂: sternite VII with shallow median impression posteriorly, without modified setae (Fig. 214); sternite VIII moderately transverse and with distinct median impression posteriorly, this impression with numerous modified, short and stout black setae, posterior excision shallow, subrectangular, and with somewhat bisinuate anterior margin (Fig. 215); aedeagus 1.8 mm long, ventral process long, slender, and bisinuate in lateral view (Figs 216–217).

Comparative notes. *Lobrathium feldmanni* is distinguished from its congeners particularly by the shape and chaetotaxy of the male sternite VIII, as well as by the morphology of the aedeagus. In addition, it is characterised by rather large body size, slender antennae, and the uniformly dark-brown coloration of the body.

Distribution and natural history. The type locality, Wangcang Xian, is situated in the northeast of Sichuan province, China (Fig. 193). Additional data are not available.

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***Lobrathium ablectum* sp. n.** (Figs 140, 218–223)

Type material. Holotype ♂: "China: W-Hubei (Daba Shan), creek valley 8 km NW Muyuping, 31°29'N, 110°22'E, 1550–1650 m, 18.VII.2001, leg. M. Schülke [CH01–16A] / creek valley, deciduous forest, moss (sifted) [CH01–16A] / Holotypus ♂ *Lobrathium ablectum* sp. n., det. V. Assing 2011" (cAss). Paratypes: 2♀♀: same data as holotype (cSch).

Etymology. The specific epithet (Latin, past participle of the verb ablegere: to send or move away) alludes to the characteristic position of the elytral spot.

Description. Relatively large species, body length 7.7–9.3 mm; length of forebody 4.4–4.6 mm. Coloration: whole body black, except for the dark-brown tarsi and apical antennomeres; elytra with a subcircular reddish spot situated in anterior portion of posterior half (i.e., at some distance from posterior margin).

Head (Fig. 218) approximately as wide as long or weakly transverse, widest across eyes; lateral margins behind eyes convexly rounded towards neck; posterior angles obsolete; dorsal surface between eyes uneven, with shallow median and lateral impressions; punctation of dorsal surface moderately coarse, but extremely dense, interstices reduced to very narrow ridges; frons and a transverse, somewhat elevated patch on vertex glossy and with sparser macropunctures, remainder of dorsal surface matt; interstices without microsculpture. Eyes rather large and strongly convex, distinctly more than half as long as distance from posterior margin of eye to neck. Antenna (Fig. 219) slender, approximately 2.5 mm long, antennomeres VI–IX at least 1.5 times as long as broad.

Pronotum (Fig. 218) long and slender, 1.3 times as long as broad and approximately 0.9 times as broad as head; lateral margins in the middle almost parallel, only indistinctly converging posteriad; punctation coarse and conspicuously dense, except for a glossy, impunctate, oblong and somewhat bulging lateral patch on either side and for the impunctate glossy midline.

Elytra (Fig. 218) long, approximately 1.1 times as long as, and distinctly broader than pronotum; humeral angles marked; punctation very coarse, dense, not arranged in series, and somewhat rugosely confluent near anterior portion of suture; interstices without microsculpture and glossy. Hind wings apparently fully developed.

Abdomen narrower than elytra; punctation fine and dense; interstices at most with traces of microsulpture and glossy; posterior margin of tergite VII with palisade fringe.

♂: posterior margin of tergite VIII truncate; sternites IV–V indistinctly depressed in the middle; sternite VI with shallow median impression posteriorly; sternite VII moderately transverse, with median impression without pubescence, posterior margin distinctly concave and in the middle weakly convex (Fig. 220); sternite VIII weakly transverse, in the middle with long and pronounced impression, this impression with a cluster of numerous distinctly modified, short and stout black setae on either side, posterior excision moderately deep and almost U-shaped (Fig. 221); aedeagus 1.35 mm long, ventral process strongly sclerotised and apically bifid (Figs 222–223).

♀: posterior margin of tergite VIII weakly convex.

Comparative notes. *Lobrathium ablectum* is readily distinguished from all its congeners not only by the male sexual characters, but also by several distinctive external characters, particularly the punctation and impressions of the head, the punctation and impunctate lateral patches of the pronotum, and the position of the elytral spot.

Distribution and natural history. The type locality is situated in the Daba Shan in the west of Hubei province, China (Fig. 140). The type specimens were sifted from moss in a deciduous forest, together with *L. taureum* and *L. spathulatum*, at an altitude of 1550–1650 m.

***Lobrathium excisissimum* sp. n.** (Figs 180, 224–228)

Type material. Holotype ♂: "China (N-Yunnan) Dali Bai Nat. Aut. Pref., Diancang Shan, 3 km W Dali old town, creek valley at "Cloud Road", right upper chairlift station, 25°41.1'N, 100°06.8'E, 2750 m (under stones, leaf litter along creek), 17.VI.2005 D.W. Wrase [11C] / Holotypus ♂ *Lobrathium excisissimum* sp. n., det. V. Assing 2011" (cAss). Paratype ♀: same data as holotype (cSch).

Etymology. The specific epithet (Latin, superlative of excisus) alludes to the pronounced posterior excision of the male sternite VIII.

Description. Large species, body length 9.0–9.5 mm; length of forebody 4.9–5.1 mm. Coloration: body black, elytra with subcircular yellowish spot reaching neither posterior nor lateral margins; legs blackish-brown with reddish tarsi; antennae blackish-brown.

Head (Fig. 224) approximately 1.1 times as wide as long; lateral margins behind eyes convexly rounded towards neck; posterior angles not marked; punctation of dorsal surface relatively fine and dense; interstices narrow, narrower than diameter of punctures, and glossy, without microsculpture; median dorsal portion and frons impunctate or sparsely punctate. Eyes moderately large and weakly convex, slightly more than half as long as distance from posterior margin of eye to neck in dorsal view. Antenna moderately slender, approximately 3.2 mm long.

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Pronotum (Fig. 224) short and broad, 1.10–1.15 times as long as broad and approximately 0.95 times as broad as head, widest anteriorly; punctation similar to that of head, but somewhat less dense; interstices glossy.

Elytra (Fig. 224) approximately 0.9 times as long as, and distinctly broader than pronotum; humeral angles marked; punctation coarse, dense, and not arranged in series; interstices without microsculpture and glossy. Hind wings apparently fully developed.

Abdomen approximately as broad as elytra; punctation fine and dense; posterior margin of tergite VII with palisade fringe; posterior margin of tergite VIII distinctly convex.

♂: sternite VI with shallow median impression posteriorly; sternite VII with extensive median impression, this impression with numerous distinctly modified, short and stout black setae, posterior margin strongly and broadly convex (Fig. 225); sternite VIII moderately transverse, with distinct median impression and remarkably deep, U-shaped posterior excision, the margins of this impression and the median excision with numerous distinctly modified, short and stout black setae (Fig. 226); aedeagus 1.6 mm long, ventral process straight in lateral view, with two pairs of pronounced ventral teeth (Figs 227–228).

Comparative notes. *Lobrathium excisissimum* is readily distinguished from all its congeners by the combination of large size, broad body (short and compact pronotum), the relatively fine and dense punctation of the head, the coloration, and particularly by the distinctive male primary and secondary sexual characters. The similarly derived shapes and chaetotaxy of the male sternite VII and VIII, as well as the similar general morphology of the aedeagus suggest that *L. excisissimum* is closely allied to *L. radens*.

Distribution and natural history. The type locality is situated in the Diancang Shan in northern Yunnan, China (Fig. 180). The type specimens were collected on a stream bank at an altitude of 2750 m.

***Lobrathium rotundiceps* (Koch, 1939)** (Figs 141, 229–230)

Lathrobium rotundiceps Koch, 1939: 163 f.

Type material examined. Holotype ♀ [dissected prior to present study]: "Tienmuschan, N.W. [sic] China Rtt. / Type / Lathrobium rotundiceps Koch, det. C. Koch / Holotypus 1956, det. Kamp / Holotypus Lathrobium rotundiceps Koch / Domene rotundiceps (Koch) ♀, V.I. Gusarov det. 1993 / Lobrathium rotundiceps Koch, det. V. Assing 2012" (NHMB).

Comment. The original descriptions is based on "ein Weibchen aus Tienmuschan (Nordwestlichen China)" (Koch 1939). The specimen is deposited in the collections of the NHMB.

Redescription. Large species, body length 10.2 mm; length of forebody 6.0 mm. Habitus as in Fig. 229. Coloration: body dark reddish-brown; legs dark-yellowish; antennae brown.

Head (Fig. 230) approximately 1.1 times as long as wide; lateral margins behind eyes convexly rounded towards neck; posterior angles completely obsolete; punctation of dorsal surface relatively fine and conspicously dense, not sparser in median dorsal portion; interstices reduced to narrow ridges everywhere; dorsal surface matt. Eyes relatively small and weakly convex, barely one third as long as distance from posterior margin of eye to neck in dorsal view. Antenna slender, approximately 4 mm long.

Pronotum (Fig. 230) slender, approximately 1.25 times as long as broad and approximately 0.95 times as broad as head, widest anteriorly, weakly tapering posteriad; punctation much coarser and less dense than that of head; interstices glossy, on average slightly narrower than diameter of punctures.

Elytra (Fig. 230) 0.92 times as long as, and distinctly broader than pronotum; humeral angles marked; punctation somewhat coarser and denser than that of pronotum, not arranged in distinct series, but partly somewhat obliquely confluent. Hind wings present and probably fully developed.

Abdomen approximately as broad as elytra; punctation fine and dense; posterior margin of tergite VII with palisade fringe; posterior margin of tergite VIII obtusely pointed in the middle.

♂: unknown.

Comparative notes. *Lobrathium rotundiceps* is characterised especially by its large body size, the ovoid shape of the distinctly oblong head (similar to the condition in many *Domene* species), as well as by the relatively fine and very dense punctation of the head.

Distribution and natural history. The type locality Zhejiang is situated in Zhejiang province, northeastern (not northwestern, as indicated on the label!) China (Fig. 141). Additional data and records are unknown.

***Lobrathium cholaicum* sp. n.** (Figs 141, 231–236)

Type material. Holotype ♂: "SE Tibet, "Chola Shan" pass, road Yanjing – Markam, 50 km S Markam, 4400 m, 29°16'N, 98°38'E, mixed forest, 24.–27.VI.1997, Jaroslav Turna leg. / Holotypus ♂ *Lobrathium cholaicum* sp. n., det. V. Assing 2011" (cAss). Paratypes: 5♂♂, 1♀: same data as holotype (cSch, cAss).

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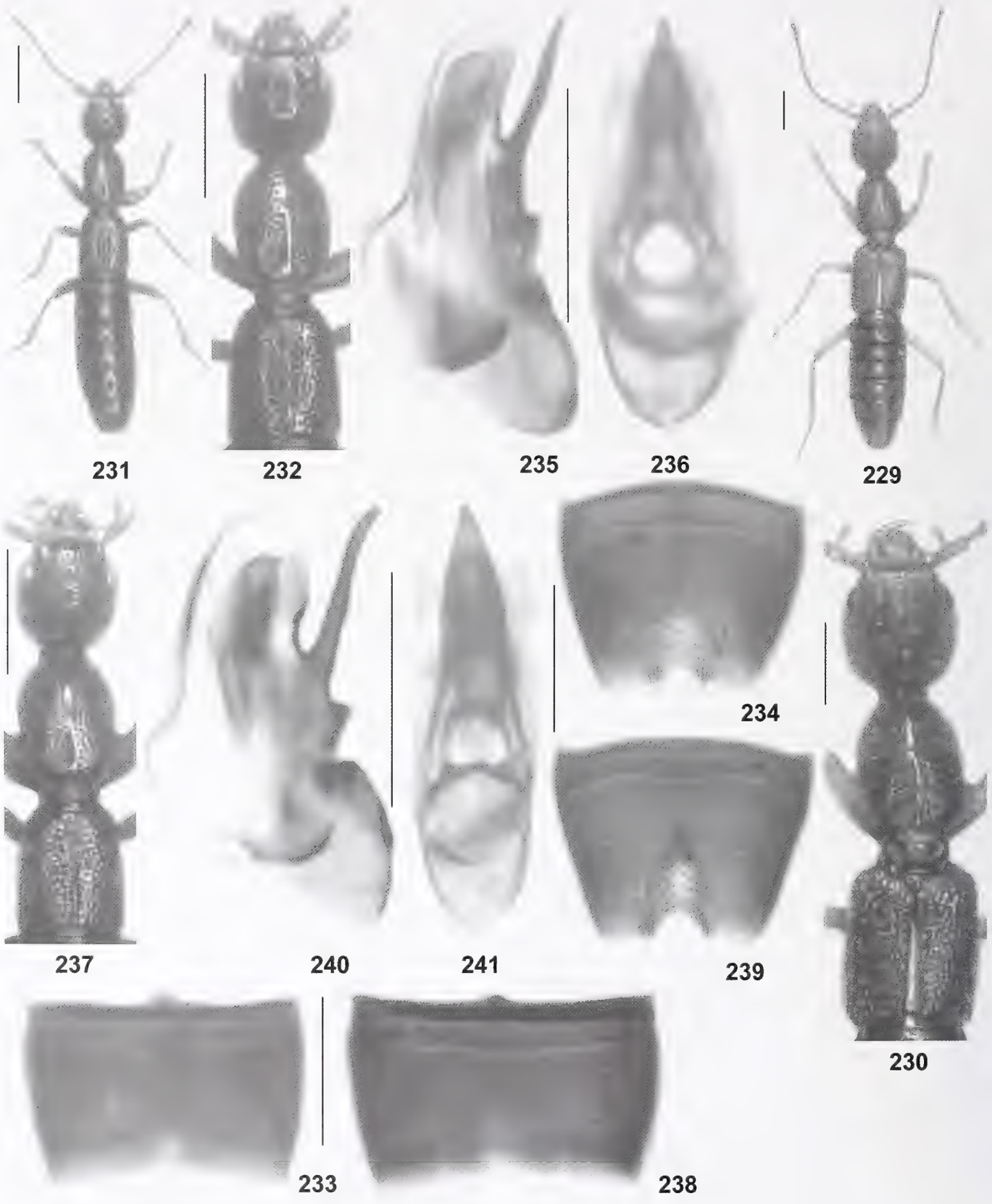

Figs 229–241. *Lobrathium rotundiceps*, holotype (**229–230**), *L. cholaicum* (**231–236**), and *L. daxuense* (**237–241**). **229, 231:** habitus; **230, 232, 237:** forebody; **233, 238:** male sternite VII; **234, 239:** male sternite VIII; **235–236, 240–241:** aedeagus in lateral and in ventral view. Scale bars: 229–232, 237: 1.0 mm; 233–236, 238–241: 0.5 mm.

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Etymology. The specific epithet (adjective) is derived from the name of the pass where the types were collected.

Description. Species of moderate size, body length 6–7 mm; length of forebody 3.4–3.6 mm. Habitus as in Fig. 231. Coloration: body blackish-brown, with the elytra usually slightly paler; legs reddish to reddish-brown; antennae reddish.

Head (Fig. 232) approximately as long as broad or weakly oblong; lateral margins behind eyes convexly rounded towards neck; posterior angles not marked; punctation of dorsal surface coarse and moderately dense, somewhat sparser on vertex and on frons; interstices glossy, without microsculpture. Eyes moderately large and moderately convex, clearly less than half as long as distance from posterior margin of eye to neck in dorsal view. Antenna moderately slender, approximately 2 mm long.

Pronotum (Fig. 232) moderately oblong, 1.20–1.25 times as long as broad and approximately 0.95 times as broad as head, widest anteriorly and noticeably tapering posteriad; punctation similar to that of head, or slightly coarser; interstices glossy.

Elytra (Fig. 232) relatively short, approximately 0.85 times as long as pronotum, distinctly widened posteriad; humeral angles weakly marked; punctation approximately as coarse as that of pronotum, but distinctly denser; interstices without microsculpture and glossy. Hind wings reduced.

Abdomen widest at segments VI/VII, distinctly broader than elytra; punctation not particularly fine and defined, dense on anterior tergites, somewhat sparser on tergite VII; interstices with very shallow, almost obsolete microsculpture and glossy; posterior margin of tergite VII without palisade fringe; posterior margin of tergite VIII truncate to very weakly convex.

♂: sternite VI with shallow median impression posteriorly; sternite VII moderately transverse, with relatively shallow median impression posteriorly, without modified setae, posterior margin broadly and weakly concave (Fig. 233); sternite VIII moderately concave, with distinct median impression, this impression with relatively sparse, distinctly modified, short and stout black setae, posterior excision rather shallow and concave, on either side of this excision with tuft of long black setae (Fig. 234); aedeagus approximately 0.9 mm long, ventral process short, almost straight in lateral view, and apically acute in ventral view (Figs 235–236).

Comparative notes. *Lobrathium cholaicum* is readily distinguished from all its congeners by the male sexual characters (shape and chaetotaxy of the male sternite VIII, morphology of the aedeagus), and from other Chinese *Lobrathium* species additionally by the absence of a palisade fringe at the posterior margin of the abdominal tergite VII.

Together with the five following species, *L. cholaicum* belongs to a group of species distributed from Nepal to western China and including also the Himalayan *L. wittmeri* and *L. kosiense*. For characters constituting this species group see the comparative notes in the section on *L. wittmeri*.

Distribution and natural history. The type locality is situated in the extreme southeast of Tibet, close to the border with Sichuan (Fig. 141). The type specimens were collected in a mixed forest at an altitude of 4400 m.

Lobrathium daxuense sp. n. (Figs 180, 237–241)

Type material. Holotype ♂: "China (W Sichuan) (4) Daxue Shan, river valley 5 km E Kangding [sic], 2500–2800 m, 30.03N, 102.00E, 20./23.V.1997 Wrase / Holotypus ♂ *Lobrathium daxuense* sp. n., det. V. Assing 2011" (cAss). Paratypes: 2♂♂, 1♀: same data as holotype (cSch, cAss); 2♂♂: "China, Sichuan, Gongga Shan, abv. Camp 3, 3300–3350 m, 23.VII.1994, A. Smetana [C19] (cSme, cAss); 1♂: "China: Sichuan Gongga Shan, Hailuogou, in front of Glacier 1, 2850 m, 29°35N, 102°00E, 7.VII.1998, A. Smetana [C76]" (cAss).

Etymology. The specific epithet (adjective) is derived from the name of the mountain range where the types were collected.

Description. Habitus as in Fig. 266. Externally highly similar to *L. cholaicum*, but distinguished as follows:

Head (Fig. 237) with less coarse and distinctly denser punctation; vertex at most with very small patch with sparse punctation. Eyes slightly larger, but still less than half as long as distance from posterior margin of eye to neck in dorsal view. Pronotum (Fig. 237) with less coarse and somewhat denser punctation. Elytra (Fig. 237) with slightly less coarse and slightly denser punctation. Abdomen with much finer and much denser punctation; posterior margin of tergite VII with narrow rudiment of a palisade fringe.

♂: sexual characters similar to those of *L. cholaicum*; sternite VII as in Fig. 238; sternite VIII in median impression with denser setae, posterior excision broader and deeper (Fig. 239); aedeagus with longer and apically less acute ventral process in different position (base closer to ventral opening) (Figs 240–241).

Comparative notes. As can be inferred from the similar external characters, the similar modifications of the male sternites VII and VIII, as well as from the similar morphology of the aedeagus, *L. daxuense* is closely related to *L. cholaicum*; for characters distinguishing these two species see the description above. From other Chinese con-

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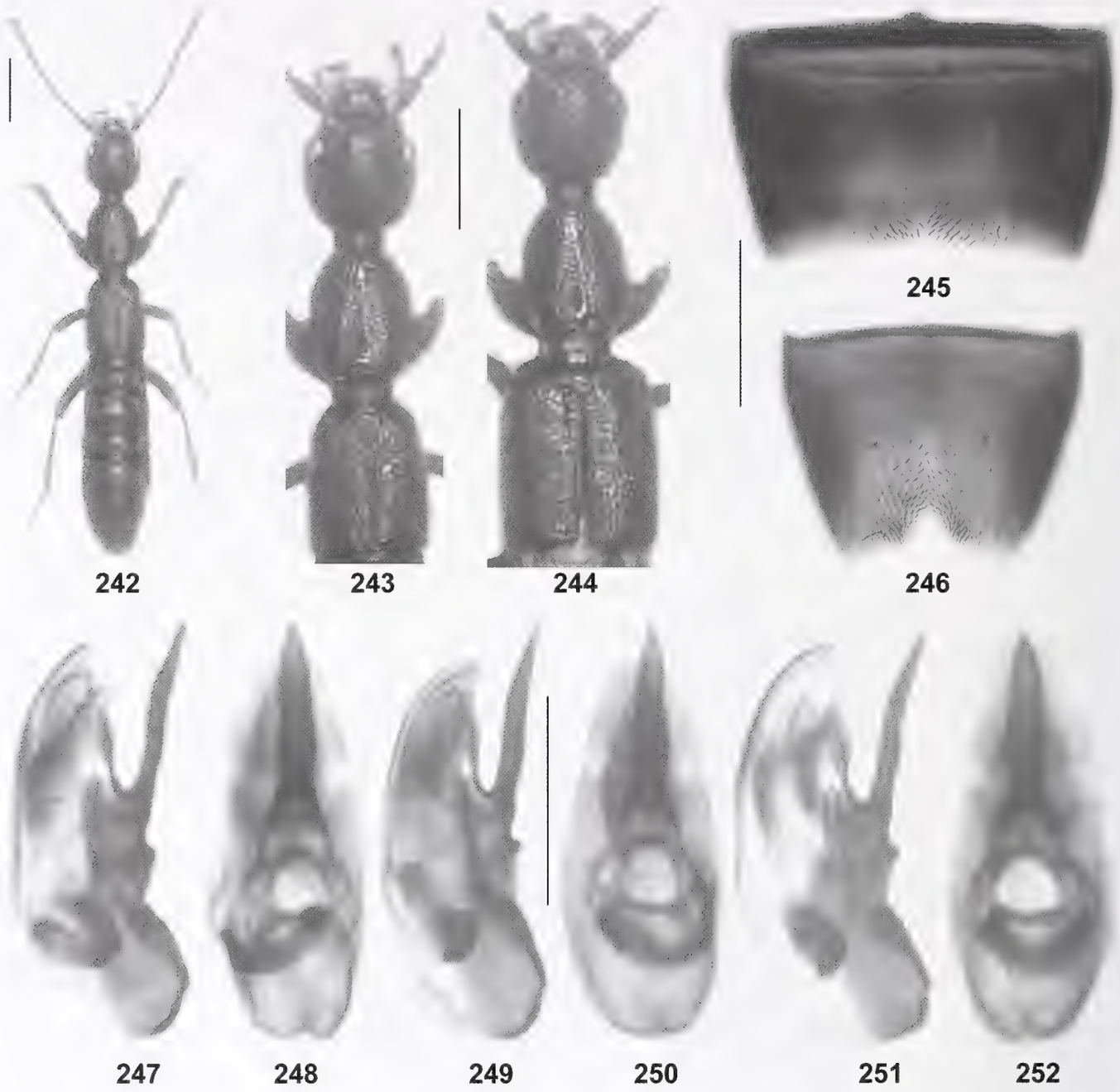

Figs 242–252. *Lobrathium bimembre*. **242:** habitus (holotype); **243–244:** forebody of micropterous (**243**) and of macropterous specimen (**244**); **245:** male sternite VII; **246:** male sternite VIII; **247–252:** aedeagus in lateral and in ventral view of males from Yanmen (**247–248**), Gaoligong Shan (**249–250**), and Diancang Shan (**251–252**). Scale bars: 242–244: 1.0 mm; 245–252: 0.5 mm.

geners, except *L. domenoides*, *L. daxuense* is separated additionally by the combination of moderate size and the short and posteriorly widened elytra. For comments on species group affiliations see the comparative notes in the sections on *L. wittmeri* and *L. cholaicum*.

Distribution and natural history. The species is currently known from two localities in the Daxue Shan in Sichuan province, China (Fig. 180). The specimens from the type locality were collected in a river valley at an altitude of 2500–2800 m, those from the Gongga Shan at elevations of 2850–3350 m. In the Gongga Shan, *L. daxuense* was collected at the edge of an original coniferous forest (mainly fir) by sifting various leaf litter and in sandy areas near a river leaving a glacier (Smetana pers. comm.) together with *L. configens*, close to where *L. duplex* was found.

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***Lobrathium bimembre* sp. n.** (Figs 141, 242–252)

Type material. Holotype ♂ [micropterous]: "China (Yunnan), Dali Bai Nat. Aut. Pref., Diancang Shan, 4 km W Dali old town, 2900–3000 m, 25°41.4'N, 100°06.7'E, E slope, former stone pit (in overgrown gravel/soil/plant roots), 31.VIII.2003 Wrase [20] / Holotypus ♂ *Lobrathium bimembre* sp. n., det. V. Assing 2011" (cAss). Paratypes: 1♀ [micropterous]: same data as holotype (cSch); 1♂, 1♀ [micropterous]: "China (Yunnan), Dali Bai Nat. Aut. Pref., Diancang Shan, 4 km W Dali old town, 2900–3000 m / 25°41.4'N, 100°06.7'E, E slope, former stone pit (in overgrown gravel/soil/plant roots/und. stones), 18.VI.2005 D.W. Wrase [12]" (cSch); 1 ♀ [micropterous]: "China (Yunnan), Dali Bai Auton. Pref., Diancang Shan W Dali, 25°41'33"N, 100°06'36"E, 2927 m (former stone pit, in gravel /under stones), 28.V.2007 D.W. Wrase [05]" (cSch); 1♂, 2♀♀ [1♂ macropterous, 2♀♀ micropterous]: "China (Yunnan) Nujiang Lisu Aut. Pref., Gaoligong Shan, pass 21 km NW Liuku, 3150 m, 25°58'22"N, 98°41'00"E (bamboo, shrubs, under stones along road), 9.VI.2007 D.W. Wrase [26]" (cSch, cAss); 1♀ [micropterous]: "China (Yunnan) Nujiang Lisu Aut. Pref., Gaoligong Shan, valley 21 km W Gongshan, 3320 m, 27°47'03"N, 98°27'39"E (moss, alder, bamboo, Rhodod., sifted), 6. VI.2007 D.W. Wrase [22]" (cSch); 1♀ [micropterous]: "China (Yunnan), Dali Bai Auton. Pref., Diancang Shan W Dali, 25°41'49"N, 100°06'24"E, 2970 m (under stones), 28.V.2007 D.W. Wrase [03]" (cSch); 1♂ [micropterous]: "China-Yunnan, 13.6.–23.6.2005, lgt. E. Kučera" (cSch).

Etymology. The specific epithet (Latin, adjective: two-shaped) alludes to the conspicuous wing-dimorphism.

Description. Wing-dimorphic species of moderately large size; body length 6.5–7.5 mm; length of forebody 3.7–4.1 mm (micropterous morph) and 4.4 mm (macropterous morph), respectively. Habitus of micropterous specimen as in Fig. 242. Externally highly similar to the slightly smaller *L. daxuense*, but distinguished as follows:

Head (Figs 243–244) with very dense punctation, also on vertex, almost completely matt. Antenna 2.3–2.5 mm long. Pronotum (Figs 243–244) with denser and slightly coarser punctation. Elytra 0.85 times (micropterous morph, Fig. 243) or 1.13 times as long as pronotum (macropterous morph, Fig. 244). Posterior margin of abdominal tergite VII with palisade fringe in both morphs.

♂: sternites III–VI unmodified; sternite VII moderately transverse, with shallow median impression posteriorly, this impression with numerous short black setae directed postero-mediad, posterior margin only indistinctly concave (Fig. 245); sternite VIII moderately tranverse, with rather long and relatively narrow median impression, this impression with numerous distinctly modified, short and stout black setae, posterior exision small, on either side with tuft of black setae (Fig. 246); aedeagus approximately 1 mm long, ventral process relatively longer than in *L. daxuense*, apically more acute (lateral view), and narrower in ventral view (Figs 247–252).

Comparative notes. *Lobrathium bimembre* is distinguished from all its congeners particularly by the male sexual characters. It is additionally separated from the syntopic, externally similar, and similarly wing-dimorphic *L. duplex* by slightly smaller size, much denser punctation of the head, shorter antennae, and by the less distinctly convex posterior margin of the abdominal tergite VIII. For comments on species group affiliations see the comparative notes in the sections on *L. wittmeri* and *L. cholaicum*.

Distribution and natural history. This species is known from several localities in the Diancang Shan, the Gaoligong Shan, and one in the environs of Yanmen, all of them in Yunnan province (Fig. 141). The specimens were collected from under stones, from gravel, and by sifting litter and debris at altitudes of 2900–3320 m. Only one male in a total of eleven specimens is macropterous.

***Lobrathium duplex* sp. n.** (Figs 193, 253–259)

Type material. Holotype ♂ [micropterous]: "China (Yunnan), Dali Bai Auton. Pref., Diancang Shan W Dali, 25°41'49"N, 100°06'24"E, 2970 m (under stones), 28.V.2007 D.W. Wrase [03] / Holotypus ♂ *Lobrathium duplex* sp. n., det. V. Assing 2011" (cAss). Paratypes: 1♂, 3♀♀ [micropterous]: same data as holotype (cSch, cAss); 1♂, 3♀♀ [micropterous]: "China (Yunnan), Dali Bai Auton. Pref., Diancang Shan W Dali, 25°41'33"N, 100°06'36"E, 2927 m (former stone pit, in gravel /under stones), 28.V.2007 D.W. Wrase [05]" (cSch); 1♂ [micropterous]: "China: N-Yunnan [C03–19], Dali Bai Nat. Aut. Pref., Diancang Shan, 3 km W Dali old town, creek valley and pine forest at "Cloud Road", right upper chairlift station, 25°41.1'N, 100°06.8'E, 2650–2750 m / [C03–19] litter, pine needles, moss (dry and wet), mushrooms, 29.VIII.2003, leg. M. Schülke" (cSch); 5♂♂, 1♀ [micropterous; 4 exs. teneral]: "China (Yunnan), Dali Bai Nat. Aut. Pref., Diancang Shan, 4 km W Dali old town, 2900–3000 m, 25°41.4'N, 100°06.7'E, E slope, former stone pit (in overgrown gravel/soil/plant roots), 31.VIII.2003 Wrase [20]" (cSch); 3♀♀ [micropterous]: "China (Yunnan), Dali Bai Nat. Aut. Pref., Diancang Shan, 4 km W Dali old town, 2900–3000 m / 25°41.4'N, 100°06.7'E, E slope, former stone pit (in overgrown gravel/soil/plant roots/und. stones), 18.VI.2005 D.W. Wrase [12]" (cSch, cAss); 9♂♂, 11♀♀ [1♂, 1♀ macropterous]: "China (W Sichuan) (4) Daxue Shan, river valley 5 km E

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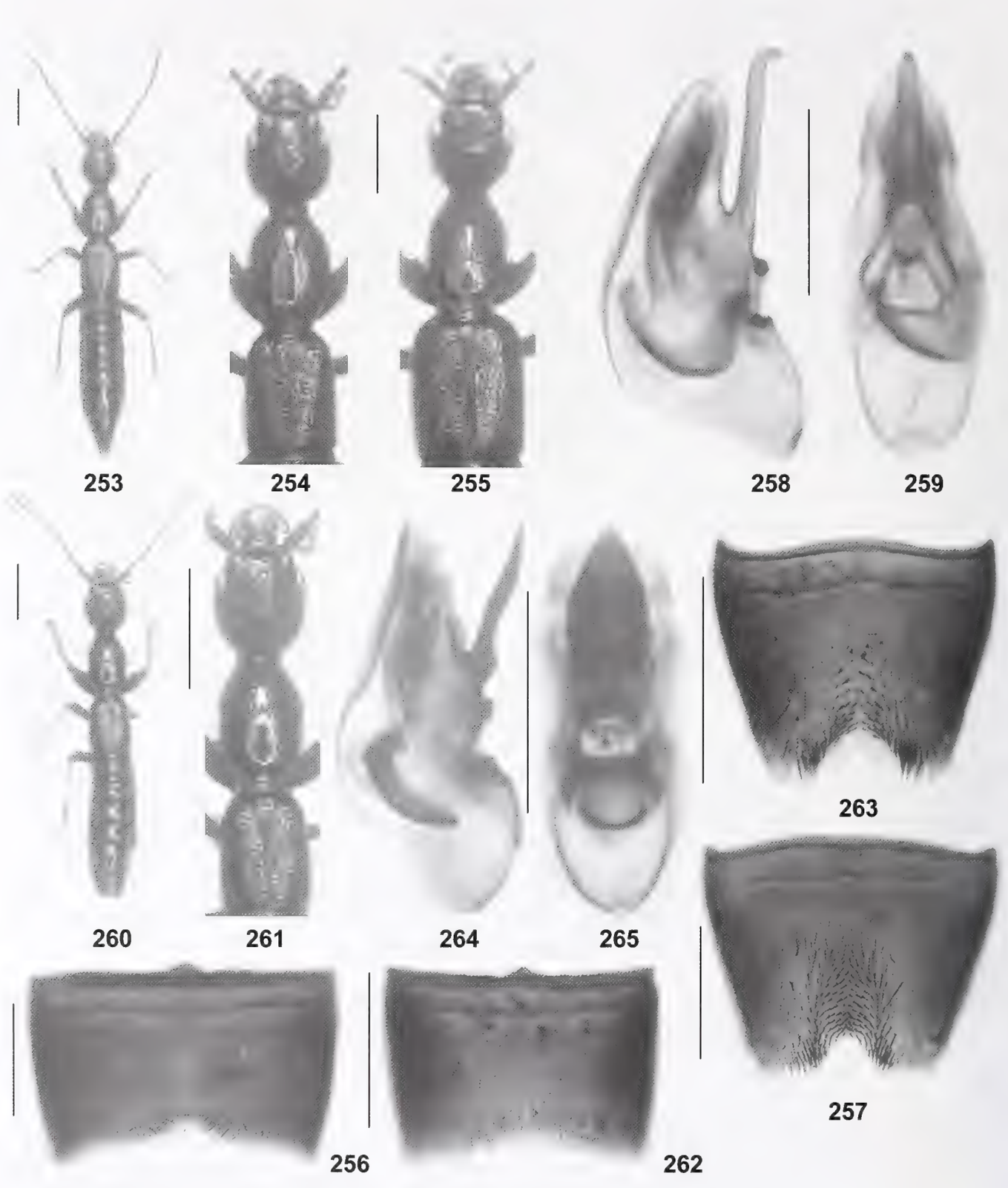

Figs 253–265. *Lobrathium duplex* (**253–259**) and *L. domenoides* (**260–265**). **253, 260:** habitus (**253:** micropterous morph); **254–255, 261:** forebody (**254**: micropterous morph; **255**: macropterous morph); **256, 262:** male sternite VII; **257, 263:** male sternite VIII; **258–259, 264–265:** aedeagus in lateral and in ventral view. Scale bars: 253–255, 260–261: 1.0 mm; 256–259, 262–265: 0.5 mm.

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Kanding [sic], 2500–2800 m, 30.03N, 102.00E, 20./23.V.1997 Wrase" (cSch, cAss); 10♂♂, 1♀: "China: W-Sichuan (4a), Daxue Shan, Bachtal 5 km E Kangding, 30.03.28N, 102.00.15E, 2500–2800 m, 23.V.1997, M. Schülke" (cSch, cAss); 2♂♂, 3♀♀ [micropterous]: "China W.Sichuan (Ganzi Tibet. Aut. Pref., Kangding Co.) Daxue Shan, brook valley 5 km E Kangding, 2500–2600 m, 30°03N, 102°00E, 24.VI.1999 D.W. Wrase" (cSch, cAss); 1♀ [micropterous]: same data, but leg. M. Schülke (cSch); 1♀: "China, S Sichuan 27.VII.1997, Daliang Shan mts., road Meigu-Leibo, pass 15 km NE Meigu, 28°25'N, 103°17'E, Jaroslav Turna leg." (cSch); 3♀♀: "China Sichuan, Gongga Shan, Hailuogou, head of Glacier 1, 2850 m, 9.VII.96, 29°35N, 102°00E, C57 / collected by A. Smetana, J. Farkač and P. Kabátek" (cSme, cAss).

Etymology. The specific epithet (Latin, adjective: twofold) refers to the conspicuous wing-dimorphism of this species.

Description. Relatively large, wing-dimorphic species, body length 7.3–9.5 mm; length of forebody 4.1–4.8 mm (micropterous morph) and 5.0 mm (macropterous morph). Habitus of holotype as in Fig. 253. Coloration: body blackish; legs with femora dark-brown to blackish, tibiae reddish-brown to blackish-brown, and tarsi reddish to dark-reddish; antennae usually reddish to reddish-brown with more or less distinctly infuscate antennomere I.

Head (Figs 254–255) usually 1.05–1.10 times as long as broad; lateral margins behind eyes smoothly curving towards neck; posterior angles usually obsolete, rarely weakly marked; punctation of dorsal surface moderately coarse and dense, slightly less dense on frons and on vertex; interstices without microsculpture, distinctly narrower than diameter of punctures (except on frons and on small patch of vertex). Eyes slightly larger and more convex in macropterous than in micropterous morph, approximately half as long as distance from posterior margin of eye to neck, or slightly longer in dorsal view. Antenna long and slender, 3.0–3.3 mm long; antennomeres IV–VIII at least twice as long as broad.

Pronotum (Figs 254–255) strongly oblong, usually 1.30–1.35 times as long as broad and approximately 0.90–0.95 times as broad as head, distinctly tapering posteriad; punctation distinctly coarser and somewhat less dense than that of head; interstices without microsculpture and glossy.

Elytra dimorphic; micropterous morph (Fig. 254): moderately short and slender, approximately 0.9 times as long as pronotum, weakly widened posteriad, and weakly convex in cross-section; humeral angles practically obsolete; macropterous morph (Fig. 255): long and broad, approximately 1.1 times as long as pronotum, with parallel lateral margins, and distinctly convex in cross-section; punctation dense and at least slightly coarser than that of pronotum, deep and well-defined to shallow and ill-defined; interstices without microsculpture and glossy. Hind wings reduced (micropterous morph) or fully developed (macropterous morph).

Abdomen widest at segment VI, distinctly broader than (micropterous morph) or approximately as broad as elytra (macropterous morph); punctation very fine and dense; interstices with distinct microsculpture and subdued shine; posterior margin of tergite VII with palisade fringe in both morphs; posterior margin of tergite VIII convex to indistinctly angled in the middle.

♂: sternites III–V unmodified; sternite VI with shallow median impression posteriorly; sternite VII strongly transverse, in the middle with impression, this impression impunctate in the middle and on either side of middle with pubescence diagonally directed postero-mediad, posterior margin broadly concave (Fig. 256); sternite VIII weakly transverse and with median impression posteriorly, this impression with numerous distinctly modified, short and stout black setae, posterior excision relatively small, on either side with dense black setae (Fig. 257); aedeagus approximately 1.1 mm long, with slender, straight, and apically curved (lateral view) ventral process (Figs 258–259).

Comparative notes. *Lobrathium duplex* is similar to the syntopic *L. daxuense* and *L. bimembr*e, but distinguished by larger body size, the longer and more slender antennae, the more strongly convex posterior margin of the abdominal tergite VIII, and by the male sexual characters, particularly the completely different shape of the ventral process of the aedeagus, from *L. bimembre* additionally by the less coarse and on average less dense punctation of the head.

Distribution and natural history. The species is currently known from the Diancang Shan (Yunnan), the Daxue Shan (western Sichuan), and the Daliang Shan (southern Sichuan) (Fig. 193). Most of the specimens were collected from under stones and from gravel in a stream valley and in a stone pit; one male was sifted from moss and litter. The altitudes range from 2500 to 3000 m. Teneral adults were found in August. One male and one female, both from the same sample, are macropterous, the remaining 58 specimens are micropterous.

Lobrathium domenoides sp. n. (Figs 141, 260–265)

Type material. Holotype ♂ [right middle and hind leg missing]: "China S.Sichuan (Ya'an Pref., Shimian Co.) Xiaoxiang Ling, 7 km S Liziping, 35 km S Shimian, 28°56N, 102°18E, 1600 m (field ridge, bamboo) 7.VII.1999 D.W. Wrase / Holotypus ♂ *Lobrathium domenoides* sp. n., det. V. Assing 2011" (cAss).

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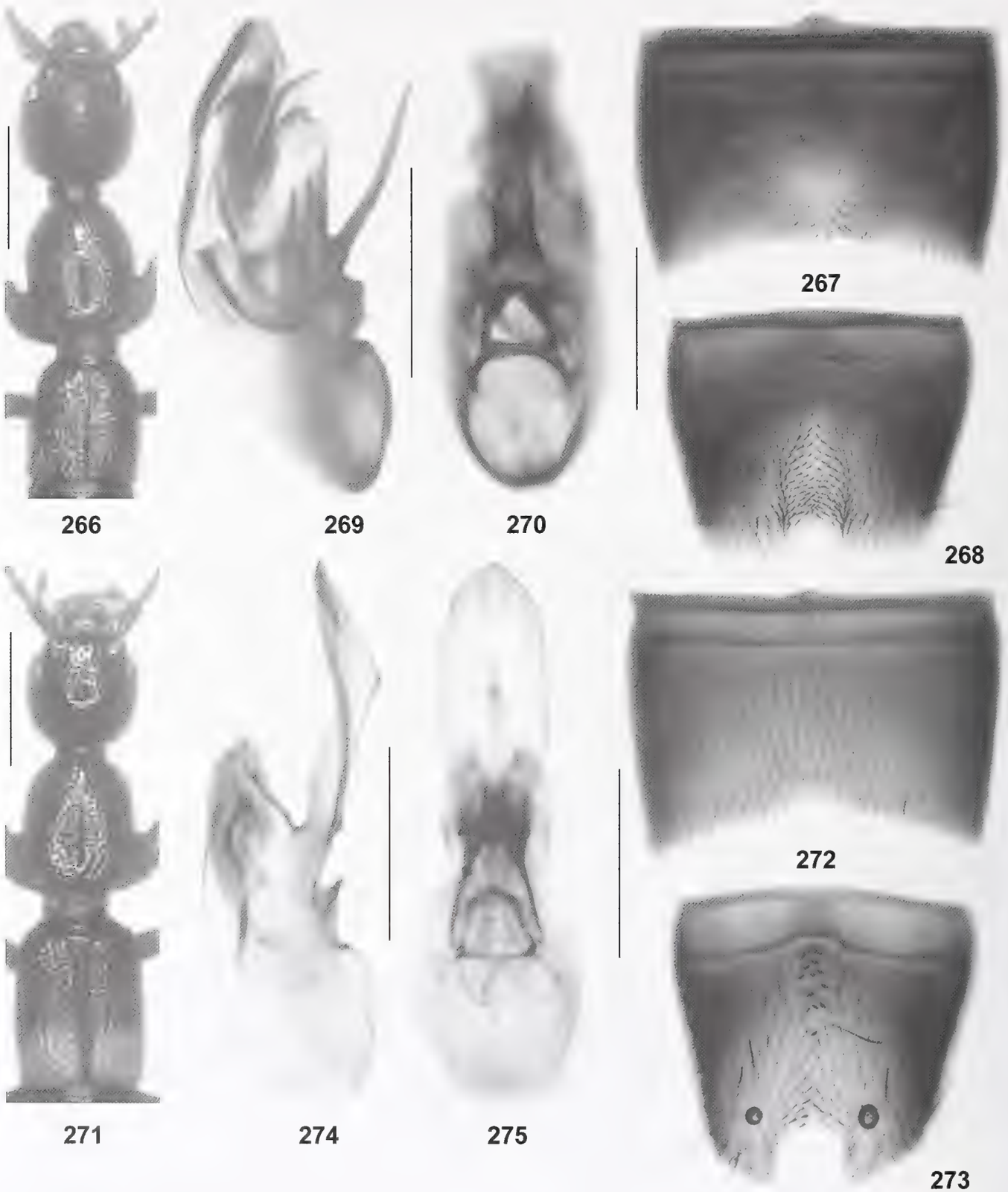

Figs 266–275. *Lobrathium lamellatum* (**266–270**) and *L. demptum* (**271–275**). **266, 271:** forebody; **267, 272:** male sternite VII; **268, 273:** male sternite VIII; **269–270, 274–275:** aedeagus in lateral and in ventral view. Scale bars: 266, 271: 1.0 mm; 267–270, 272–275: 0.5 mm.

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Etymology. The specific epithet (adjective) alludes the fact that the facies of this species somewhat resembles that of species of the genus *Domene* Fauvel, 1873.

Description. Small species, body length 6 mm; length of forebody 3.3 mm. Habitus as in Fig. 260. Coloration: body blackish-brown; legs brown with blackish-brown femora; antennae reddish-brown with infuscate antennomere I.

Head (Fig. 261) approximately 1.1 times as long as broad, of ovoid shape; lateral margins behind eyes evenly curving towards neck; posterior angles obsolete; punctation of dorsal surface relatively fine and, except for the sparsely punctate frons, very dense, not sparser on vertex than in lateral dorsal portions. Eyes small, approximately one third as long as distance from posterior margin of eye to neck in dorsal view. Antenna long and slender, approximately 2.2 mm long; antennomeres VI–IX at least 1.5 times as long as broad.

Pronotum (Fig. 261) strongly oblong, approximately 1.35 times as long as broad and approximately 0.9 times as broad as head, distinctly tapering posteriad; punctation distinctly sparser than that of head; interstices without microsculpture and glossy.

Elytra (Fig. 261) short and very slender, only 1.08 times as wide and approximately 0.7 times as long as pronotum, somewhat widened posteriad; humeral angles practically obsolete; punctation dense and much coarser than that of pronotum; interstices without microsculpture and glossy. Hind wings reduced.

Abdomen widest at segment VI, 1.15 times as broad as elytra; punctation very fine, barely noticeable, relatively dense on tergites III–VI, sparser on tergite VII; interstices with distinct microsculpture and subdued shine; posterior margin of tergite VII with palisade fringe; posterior margin of tergite VIII weakly convex.

♂: sternites III–VI unmodified; sternite VII with shallow median impression, posterior margin weakly and broadly concave (Fig. 262); sternite VIII weakly transverse, median impression shallow and with numerous distinctly modified, short and stout black setae; posterior excision relatively broad and not very deep, margins semimembranous, on either side of excision with tuft of long black setae (Fig. 263); aedeagus small, 0.75 mm long, with blade-shaped ventral process (Figs 264–265).

Comparative notes. *Lobrathium domenoides* is characterised by its small body size, the habitus (ovoid head, strongly oblong pronotum, slender and short elytra), and by the male sexual characters. For comments on species group affiliations see the comparative notes in the sections on *L. wittmeri* and *L. cholaicum*.

Distribution and natural history. The type locality is situated near Liziping in southern Sichuan province, China (Fig. 141). The holotype was collected in a field margin at an altitude of 1600 m. The rather low altitude and the presence of a distinct palisade fringe at the posterior margin of the abdominal tergite VII suggest that the species may be wing-dimorphic and more widespread.

Lobrathium lamellatum sp. n. (Figs 180, 266–270)

Type material. Holotype ♂: "China: Sichuan, 24.7.1995, 28°07'N, 101°05'E, 30 km NW Muli/Bowa, 3500 m, leg. J. Turna / Holotypus ♂ *Lobrathium lamellatum* sp. n., det. V. Assing 2012" (NHMW).

Etymology. The specific epithet (adjective) alludes to the thin ventral process of the aedeagus (lateral view), one of the characters distinguishing this species from its closest relatives.

Description. Species of moderate size, body length 7 mm; length of forebody 3.8 mm. Coloration: body blackish; legs dark-brown with reddish tarsi; antennae dark-brown.

Head (Fig. 266) approximately 1.05 times as long as broad, of ovoid shape; lateral margins behind eyes evenly curving towards neck; posterior angles obsolete; punctation of dorsal surface relatively coarse and, except for the sparsely punctate frons, very dense, not distinctly sparser on vertex than in lateral dorsal portions; dorsal surface matt. Eyes small, little more than one fourth as long as distance from posterior margin of eye to neck in dorsal view. Antenna moderately slender approximately 2.2 mm long; antennomeres VI–IX less than 1.5 times as long as broad.

Pronotum (Fig. 266) moderately oblong, approximately 1.25 times as long as broad and approximately 0.9 times as broad as head, distinctly tapering posteriad; punctation distinctly sparser and somewhat coarser than that of head; interstices without microsculpture and glossy.

Elytra (Fig. 266) short and narrow, only 1.05 times as wide and approximately 0.7 times as long as pronotum, slightly widened posteriad; humeral angles practically obsolete; punctation similar to that of pronotum, but shallower and less defined; interstices without microsculpture and glossy. Hind wings reduced.

Abdomen widest at segment VI, about 1.15 times as broad as elytra; punctation fine, dense on tergites III–VI, slightly sparser on tergite VII; interstices with distinct microsculpture and subdued shine; posterior margin of tergite VII without palisade fringe; posterior margin of tergite VIII weakly convex.

♂: sternites III–VI unmodified; sternite VII with shallow median impression posteriorly, this impression with about 15 modified, short and stout black setae posteriorly, anterior to these setae with a small area without pubescence, posterior margin broadly concave (Fig. 267);

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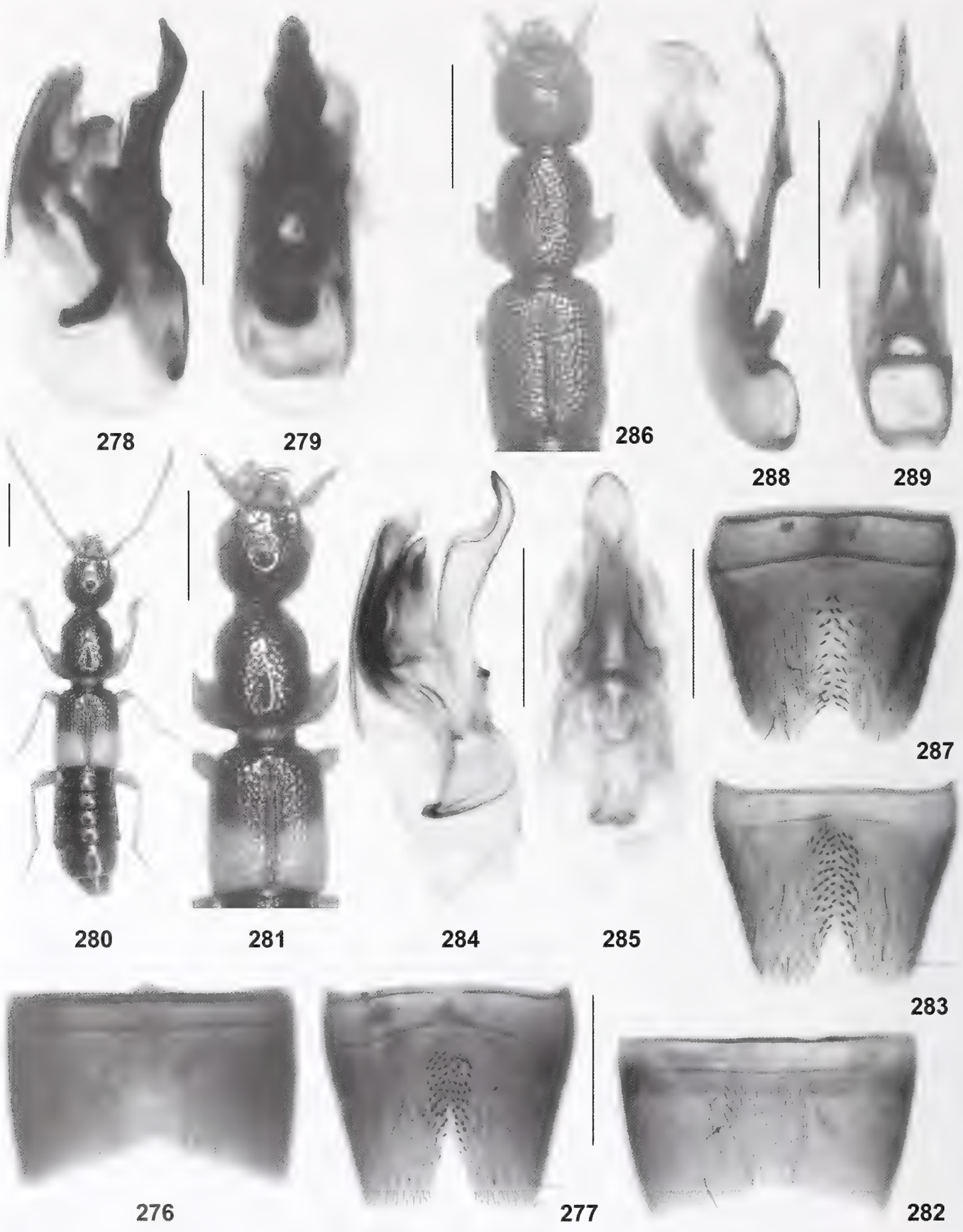

Figs 276–289. *Lobrathium partitum* (**276–279**), *L. semiflavum* (**280–285**) and *L. cribricolle*, lectotype (**286–289**). **276, 282:** male sternite VII; **277, 283, 287:** male sternite VIII; **278–279, 284–285, 288–289:** aedeagus in lateral and in ventral view; **280:** habitus; **281, 286:** forebody. Scale bars: 280–281, 286: 1.0 mm; 276–279, 282–285, 287–289: 0.5 mm.

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sternite VIII weakly transverse, median impression oblong and with numerous distinctly modified, short and stout black setae; posterior excision small (Fig. 267); aedeagus 1.0 mm long, with slender, slightly asymmetric, and, in lateral view, very thin ventral process (Figs 269–270).

Comparative notes. *Lobrathium lamellatum* is characterised by numerous characters, particularly its small eyes, the extremely dense and relatively coarse punctation of the head, the short elytra, the absence of a palisade fringe at the posterior margin of tergite VII, the chaetotaxy of the male sternite VII, and by the morphology of the aedeagus. For comments on species group affiliations see the comparative notes in the sections on *L. wittmeri* and *L. cholaicum*.

Distribution and natural history. The type locality is situated in the southwest of Sichuan province, not far from the border with Yunnan (Fig. 180). Morphological characters (small eyes, reduced wings, absence of a palisade fringe) and the altitude of the type locality (3500 m) suggest that the species may have a restricted distribution.

Lobrathium sp. n. 1

1♀ [micropterous]: "China, S Sichuan 27.VII.1997, Daliang Shan mts., road Meigu-Leibo, pass 15 km NE Meigu, 28°25'N, 103°17'E, Jaroslav Turna leg." (cSch).

This evidently undescribed species is similar to *L. daxuense*, but distinguished by broader habitus, slightly larger size, and a denser and less coarse punctation of the head.

Lobrathium sp. n. 2

1♀: "China, W-Hubei, 20.6.–12.7.2003, Muyuping S env., pitfall traps, 31.45N, 110.4E, ca. 1300 m, J. Turna" (NHMW).

This species is distinguished from all described Chinese representatives of the genus by the following characters combination: body size moderate, 6.5 mm; length of forebody 4.0 mm; punctation of head, except for the sparsely punctate frons, extremely dense, without sparsely impunctate patches, and matt; eyes large and protruding, lateral margins of head smoothly curved towards neck behind eyes; pronotum slender; coloration of forebody blackish-brown, elytra indistinctly reddish in posterior 2/3.

SPECIES FROM OTHER EAST PALAEARCTIC REGIONS

Lobrathium partitum (Sharp, 1874) (Figs 276–279)

Lathrobium partitum Sharp, 1874: 56 f.

Type material examined. Syntype ♀ [dissected prior to present study]: "Japan / Lathrobium partitum type D.S. / Type / Japan. G. Lewis. / Sharp Coll 1905–313. / Lectotypus Lathrobium partitum Sharp, V. Gusarov des. 1992 / Lobrathium partitum (Sharp) ♀, V.I. Gusarov det. 1992 / Syntype Lathrobium partitum Sharp, rev. V. Assing 2012 / Lobrathium partitum (Sharp), det. V. Assing 2012" (BMNH).

Comment. The original description is based on an unspecified number of syntypes from "under tidal refuse, Nagasaki harbour" (Sharp 1874). It can be inferred from Sharp´s statement that the species is "very local" that he had only few syntypes, possibly only one specimen before him. The single syntype in the Sharp collection at the BMNH, a female, has a lectotype label attached to it, but the designation has never been published. In view of the fact that *Lobrathium* species are usually reliably identified only based on the male sexual characters, the above type specimen is not designated as the lectotype.

Additional material examined. Japan: Kyushu: 1♂, Nagasaki Pref., Kunimi, Uematsu, 3.XI.1982, leg. Imasaka (cIto). **Shikoku:** 1♂: Ehime, Oku-Dogo, 22.XII.1991, leg. Okamoto (cAss). **Honshu:** 1♂ [teneral], Fukui Pref., Mana-gawa river, 1.VIII.1965, leg. Hayashi (cAss); 1♂ [teneral], Wakayama Pref., Mt. Iwawaki, 9.VI.1968, leg. Kimura (cAss); 1♂, Yokohama (BMNH).

Redescription. Body length 7.0–8.0 mm; length of forebody 3.5–4.1 mm. External characters as in *L. taureum*. Distinguished only by the male sexual characters.

♂: sternite V with small median depression posteriorly; sternite VI with moderately small and shallow median impression posteriorly; sternite VII strongly transverse and with distinct median impression with pubescence, posterior margin broadly concave (Fig. 276); sternite VIII weakly transverse, with pronounced long median impression, this impression with numerous modified, short and stout black setae, posterior excision moderately small and narrowly V-shaped (Fig. 277); aedeagus approximately 1.3–1.4 mm long, ventral process symmetric and of distinctive shape, in the middle distinctly dilated in ventral view (Figs 278–279).

Comparative notes. In external characters, *L. partitum* is highly similar to *L. taureum*, *L. schuelkei*, and *L. semiflavum*. The similar general morphology of the aedeagus as well as the similar male secondary sexual characters suggest that the species is most closely related to *L. semi-*

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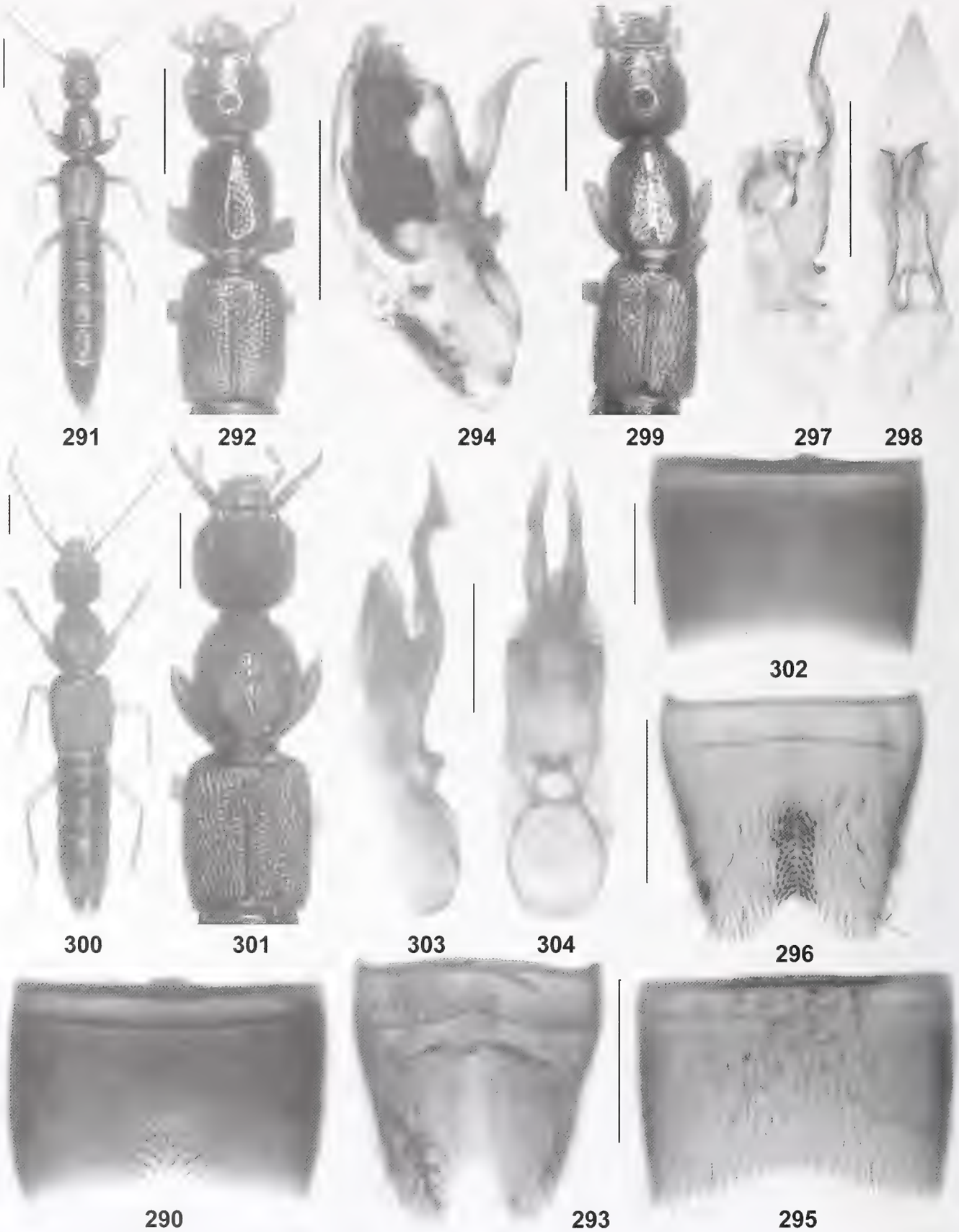

Figs 290–304. *Lobrathium cribricolle*, lectotype (**290**), *L. nudum* (**291–294**), *L. amamiense* (**295–298**), *L. indubium*, syntype (**299**), and *L. discrepans* (**300–304**). **290, 295, 302:** male sternite VII; **291, 300:** habitus; **292, 299, 301:** forebody; **293, 296:** male sternite VIII; **294, 297–298, 303–304:** aedeagus in lateral and in ventral view. Scale bars: 291–292, 299–301: 1.0 mm; 290, 293–398, 302–304: 0.5 mm.

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flavum, from which it is reliably distinguished only by the shape of the ventral process of the aedeagus both in lateral and in ventral view (*L. semiflavum*: not distinctly dilated in the middle in ventral view) and the slightly narrower posterior excision of the male sternite VIII.

Distribution. *Lobrathium partitum* was originally described from the environs of Nagasaki, Kyushu, southern Japan, and subsequently also reported from Honshu (Kameyama et al. 2006); for additional records from these islands and from Shikoku see the additional material above.

***Lobrathium semiflavum* sp. n.** (Figs 193, 280–285)

Type material. Holotype ♂ [teneral]: "Russia or: Primorie, Ussurijsky Res., Komarovo Zapovednoe, 132°20'40"E, 43°38'48"N, 20.–29.VII.1999, leg. J. Sundukov / Holotypus ♂ *Lobrathium semiflavum* sp. n., det. V. Assing 2011" (cAss). Paratypes: 1♂, 1♀ [teneral]: same data as holotype (cSch).

Etymology. The specific epithet (Latin, adjective) refers to the fact that nearly all of the posterior half of the elytra is bright yellowish.

Description. Body length 5.8–7.8 mm; length of forebody 3.5–4.0 mm. Habitus as in Fig. 280. Coloration and other external characters as in *L. partitum*, except as follows:

Elytra without bluish hue and on average slightly shorter and narrower (Fig. 281); appendages paler: legs dark-yellowish; antennae pale-reddish (but note that all the type specimens are somewhat teneral).

♂: sternite V with very small and shallow impression posteriorly; sternite VI with moderately small and moderately shallow impression posteriorly; sternite VII strongly transverse and with distinct median impression with pubescence, posterior margin broadly concave (Fig. 282); sternite VIII weakly transverse, with pronounced long median impression, this impression with numerous modified, short and stout black setae, posterior excision relatively small and almost V-shaped (Fig. 283); aedeagus 1.2–1.4 mm long, ventral process symmetric and of distinctive shape (Figs 284–285).

Comparative notes. Based on the similar external and male sexual characters, *L. semiflavum* is presumably the adelphotaxon of *L. partitum*. For distinguishing characters see the description above and the comparative notes in the preceding section.

Distribution and natural history. The type locality is situated in Primorskiy Kray, Russian Far East (Fig. 193). All type specimens were collected in July and are teneral.

***Lobrathium cribricolle* (Sharp, 1889)** (Figs 286–290)
Lathrobium cribricolle Sharp, 1889: 256.

Type material examined. Holotype ♂: "Lathrobium cribricolle. Type D.S. [written on mounting label] / Japan. G. Lewis. 1910–320. / Suyama. 20.IV.–22.IV.80. / Type / aedeagus at rest is turned to 90° in abdomen / Lobrathium cribricolle (Sharp) ♂, V.I. Gusarov det. 1992 / Holotypus ♂ Lathrobium cribricolle Sharp, V. Gusarov des. [sic] 1992 / Lobrathium cribricolle (Sharp), det. V. Assing 2012" (BMNH).

Comment. The original description is based on a "unique" holotype from the "Plain under Fujisan" (Sharp 1889).

Redescription. Body length 6.6 mm; length of forebody 3.5 mm. Coloration: body blackish, elytra with yellowish spot posteriorly; legs and antennae pale-reddish.

Head (Fig. 286) approximately 1.05 times as long as broad, of subrectangular shape; lateral margins behind eyes subparallel in dorsal view; posterior angles moderately marked; punctation conspicuously coarse and dense, even in median dorsal portion; interstices reduced to narrow ridges. Eyes bulging and large, approximately 0.6–0.7 times as long as distance from posterior margin of eye to neck in dorsal view. Antenna relatively short, approximately 1.8 mm long.

Pronotum (Fig. 286) approximately 1.25 times as long as broad and 0.95 times as broad as head; punctation conspicuously coarse and dense, even along midline; only in posterior median portion with small impunctate patch.

Elytra (Fig. 286) 1.07 times as long as pronotum; punctation coarse, arranged in irregular series only laterally. Hind wings apparently fully developed.

Abdomen subparallel and slightly narrower than elytra; punctation fine and moderately dense, slightly less dense on tergites VII and VIII; interstices with distinct transverse microsculpture; posterior margin of tergite VII with palisade fringe.

♂: posterior margin of tergite VIII convex in the middle; sternite VI with shallow impression posteriorly; sternite VII with shallow median impression posteriorly, this impression with few (approximately 15–20) modified, short and stout black setae, posterior margin broadly and rather weakly concave (Fig. 290); sternite VIII weakly transverse, with oblong median impression, this impression with relatively sparse modified, short and stout black setae, posterior excision not very deep and of trapezoid shape (Fig. 287); aedeagus 1.3 mm long, with long ventral process of highly distinctive shape (Figs 288–289).

Comparative notes. *Lobrathium cribricolle* is characterised particularly by the coarse and dense punctation of the head and pronotum, by the shape and chaetotaxy of

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the male sternites VII and VIII, as well as by the distinctive shape of the ventral process of the aedeagus.

Distribution. The distribution of *L. cribricolle* is confined to Japan (Honshu). For additional records see Ito (1996a).

***Lobrathium nudum* (Sharp, 1889)** (Figs 291–294)
Lathrobium nudum Sharp, 1874: 55 f.

Type material examined. Lectotype ♂ and paralectotype ♀ [glued on same label]: "Japan / Japan. G. Lewis. / Lathrobium nudum Type D.S. / Sharp Coll 1905–313. / Type / aedeagus at rest is turned to 90° in abdomen / Lobrathium nudum (Sharp) ♂, V.I. Gusarov det. 1992 / Lectotype ♂ Lathrobium nudum Sharp, V. Gusarov des. 1992 / Paralectotype ♀ Lathrobium nudum Sharp, V. Gusarov des. 1992 / Lobrathium nudum (Sharp), det. V. Assing 2012" (BMNH).

Comment. The original description is based on an unspecified number of syntypes ("not very rare"), among them at least one male, from "Nagasaki" (Sharp 1874). In referring to the above material as lecto- and paralectotype and illustrating the aedeagus as that of the lectotype, Ito (1996a) designated the male as the lectotype. The two type specimens have lectotype and paralectotype labels by V. Gusarov attached to them, who never published this designation.

Redescription. Body length 7.0–.7.5 mm; length of forebody 3.4–3.6 mm. Habitus as in Fig. 291. Coloration: head, pronotum, and abdomen blackish; elytra dark-brown to blackish-brown, posteriorly with a large yellowish spot reaching posterior margin; legs reddish, with the profemora and sometimes also the protibia darker; antennae reddish.

Head (Fig. 292) approximately as long as broad, weakly narrowed behind eyes in dorsal view; posterior angles moderately marked; punctation moderately coarse and moderately dense, rather sparse in median dorsal portion and on frons. Eyes moderately convex and large, approximately 0.6–0.7 times as long as the distance from posterior margin of eye to neck in dorsal view. Antenna relatively short, approximately 1.8 mm long.

Pronotum (Fig. 292) 1.25–1.30 times as long as broad and approximately 0.95 times as broad as head; punctation similar to that of head; midline impunctate.

Elytra (Fig. 292) approximately as long as pronotum; punctation coarse, arranged in irregular series. Hind wings fully developed.

Abdomen subparallel and slightly narrower than elytra; punctation fine and moderately dense; interstices without distinct microsculpture, except for shallow traces in posterior portions of tergites VII and VIII; posterior margin of tergite VII with palisade fringe; posterior margin of tergite VIII convex in both sexes.

♂: sternite VI unmodified; sternite VII anteriorly with pair of tubercles, in the middle with large impression without pubescence, posterior margin broadly and distinctly concave; sternite VIII approximately as broad as long, in the middle with oblong impression without modified setae, and with relatively deep and V-shaped posterior excision (Fig. 293); aedeagus approximately 1.0 mm long and with ventral process of distinctive shape (Fig. 294).

Comparative notes. *Lobrathium nudum* is characterised particularly by the relatively large yellowish spot on the elytra (reaching posterior margin), by the modifications of the male sternites VII and VIII, as well as by the shape of the ventral process of the aedeagus.

Distribution. *Lobrathium nudum* has been recorded from several localities in Japan (Kyushu, Honshu); for additional records see Ito (1996a), Watanabe (1998c), and Watanabe & Shibata (1972). Watanabe & Onoda (1997) report the species from Kuroshima Island (Ryukyu Islands). It has been reported also from the Russian Far East (Smetana 2004), but this record should be considered doubtful and requires confirmation. In the course of the present revision, none of the species from the main islands of Japan was recorded also from continental Asia. The only species whose presence in both Japan and continental Asia is confirmed is *L. hongkongense*, whose distribution in Japan is confined to the extreme south (Ryukyu Islands).

***Lobrathium amamiense* Ito, 1996** (Figs 295–298)
Lobrathium amamiense Ito, 1996: 116 ff.

Type material examined. Paratype ♂ [slightly teneral]: "Hatsuno, Amami Is., 4.IV.1966, T. Ito / Paratype Lobrathium amamiense T. Ito. sp. nov. " (cAss).

Comment. The original description of *L. amamiense* is based a male holotype and eleven paratypes from three localities in the "Amami-Oshima Is., Kagoshima Pref." (Ito 1996). For a detailed description of the external characters see Ito (1996).

Redescription of the male sexual characters. Posterior margin of tergite VIII obtusely pointed in the middle; sternite VII with shallow median impression and without modified pubescence, posterior margin broadly concave (Fig. 295); sternite VIII weakly transverse, in posterior half with well-defined oblong median impression, this impression with numerous modified, short and stout black setae, posterior excision moderately deep and moderately broad (Fig. 296); aedeagus approximately 1.2 mm long, ventral process blade-shaped and large, symmetric, subapically

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with median carina, and basally with few lateral teeth (Figs 297–298).

Comparative notes. *Lobrathium amamiense* is distinguished from its congeners particularly by the shape and chaetotaxy of the male sternite VIII, by the shape of the ventral process of the aedeagus, and from most other macropterous species distributed in the East Palaearctic also by the coloration of the elytra (diffusely dark-reddish in posterior half, without defined spots).

Distribution and natural history. As far as is currently known, the distribution of *L. amamiense* is confined to the Amami Islands, southern Japan. The examined paratype is slightly teneral.

Lobrathium varium Ito, 1995, stat. n.

Lobrathium shibatai varium Ito, 1995: 43.

Material examined. Japan: 17 exs. [previously labelled as types of *L. kasuganum* Gusarov i.l., labels removed; partly teneral], Honshu, Nara, foot of Mt. Kasuga, 20.VIII.1980, leg. Hammond (BMNH, cAss).

Comment. According to the original descriptions of *L. shibatai shibatai* and *L. shibatai varium*, these taxa are subspecies distinguished by slight differences in the shape of the ventral process of the aedeagus, the slightly different shapes of the impressions of the male sternites VII and VIII, and the slightly more slender body of *L. varium* (Ito 1995). However, zoogeographic evidence (see distribution map in Ito 1995) renders the hypothesis that both morphs should represent subspecies highly implausible; both morphs were described from central Honshu. According to Ito (e-mail, 3.II.2012), who has seen more material in the meantime, the distributions of both taxa strongly overlap, so that they should be considered distinct species rather than subspecies.

Lobrathium indubium (Eppelsheim, 1893) (Fig. 299)

Lathrobium indubium Eppelsheim, 1893: 52 f.
Platydomene altaicus [sic] Coiffait, 1967: 355 f.; synonymy by Shavrin (2008).

Type material examined. Syntypes: 2♀♀: "Ost-Sibirien. Quellgebiet des Irkut. Leder 1891. / indubium Epp. / c. Epplsh. Steind. d. / Typus [one labelled as lectotype, the other as paralectotype by V. Gusarov]" (NHMW).

Comment. The original description, which is contained in a work on the southwestern Baikal region, is based on two females without specification of the locality (Eppelsheim 1893). Both syntypes are deposited in the Eppelsheim collection at the NHMW. They have (para-)lectotype labels by V. Gusarov attached to them, but this designation was never published.

Redescription. Body length: 6.0–6.8 mm; length of forebody 3.4–3.9 mm. Coloration: forebody reddish to reddish-brown, with the elytra often somewhat paler; elytra often with indistinct reddish spots posteriorly and/or with yellowish posterior margins; abdomen dark-brown; legs and antennae dark-reddish.

Head (Fig. 299) somewhat flattened, as long as broad or weakly oblong; punctation moderately coarse and dense; median dorsal portion with few scattered punctures, almost impunctate. Eyes weakly convex and small, approximately 1/3 the length of postocular region in dorsal view. Antenna 2.0–2.4 mm long.

Pronotum (Fig. 299) weakly convex in cross-section, almost flattened, and slender, approximately 1.3 times as long as broad and 0.9 times as broad as head; punctation similar to that of head, but slightly less dense; midline with broad and complete impunctate band.

Elytra (Fig. 299) weakly convex in cross-section, approximately as long as pronotum, or nearly so; punctation dense and moderately defined, not arranged in distinct series.

Abdomen approximately as broad as elytra; posterior margin of tergite VII with palisade fringe; posterior margin of tergite VIII broadly and rather weakly convex.

♂: sternite VIII with long median impression; this impression with numbers strongly modified, short and stout black setae, posterior excision of moderate size; aedeagus approximately 1.3 mm long, with long, symmetric, basally dilated (ventral view), and apically acute ventral process. For illustrations of the aedeagus see Coiffait (1967, 1982c) (as *Platydomene altaicus* [sic]).

Comparative notes. *Lobrathium indubium* somewhat resembles *L. multipunctum* in size and coloration, but is distinguished from that species by the flatter body and the irregular punctation of the elytra.

Distribution. The known distribution of this species includes the Baikal region (Altai, East Sayan) and the Russian Far East (Primorskiy Kray) (Assing 2007, Schülke 1990, Shavrin 2008).

Lobrathium discrepans sp. n. (Figs 140, 300–305)

Type material: Holotype ♂: "N-Vietnam, 120 km SW Hanoi, Cuc Phuong National Park, 13.04.2010, leg. A. Kleeberg / Holotypus ♂ *Lobrathium discrepans* sp. n., det. V. Assing 2011" (cAss).

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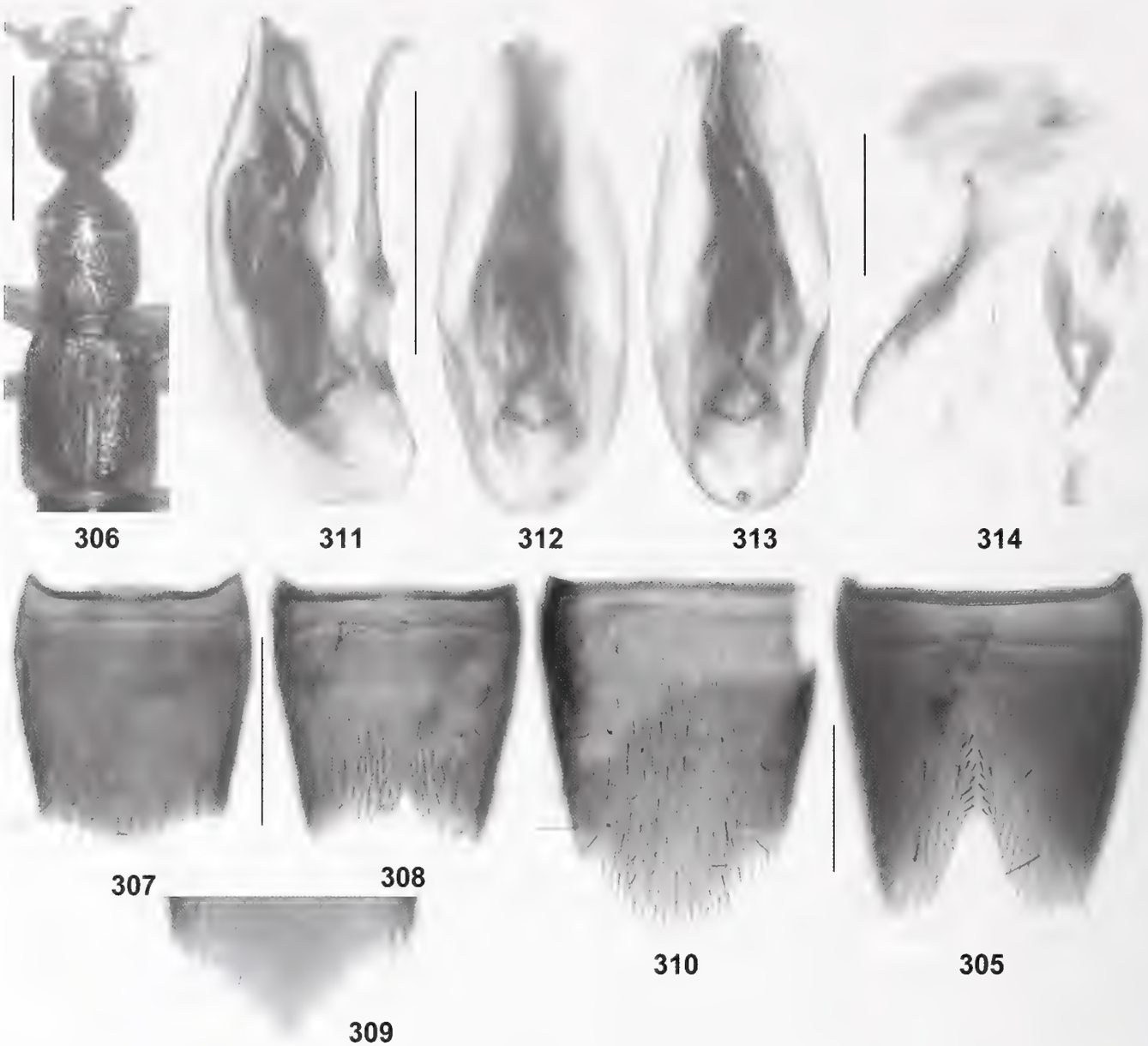

Figs 305–314. *Lobrathium discrepans* (**305**) and *Tetartopeus gracilentus* (**306–314**). **305, 308:** male sternite VIII; **306:** forebody; **307:** male tergite VIII; **309:** posterior portion of female tergite VIII; **310:** female sternite VIII; **311–313:** aedeagus in lateral, ventral, and in dorsal view; **314:** internal structures of aedeagus extruded in lateral view. Scale bars: 306: 1.0 mm; 305, 307–313: 0.5 mm; 314: 0.2 mm.

Etymology. The specific epithet (Latin, adjective: deviant) refers to the fact that this species differs in many ways from the usual morphology of *Lobrathium* species.

Description. Large species, body length 10.3 mm; length of forebody 5.6 mm. Habitus as in Fig. 300. Coloration: body blackish, except for the reddish posterior margins of the abdominal segments VII and VIII; forelegs blackish with reddish tarsi; middle and hind legs with pale-yellowish femora, infuscate tibiae, and reddish tarsi; antenna in basal half blackish-brown, with antennomere I black and II dark-reddish; antennomeres in apical half gradually becoming reddish.

Head (Fig. 301) approximately as long as broad, posterior angles broadly convex; punctation moderately coarse and extremely dense; interstices reduced to narrow ridges. Eyes large, approximately 0.7 times as long as the distance from posterior margin of eye to neck in dorsal view. Antenna slender, approximately 3.2 mm long.

Pronotum (Fig. 301) short and broad, 1.12 times as long as broad and approximately as broad as head; punctation as dense as, and slightly coarser than head; impunctate midline reduced, narrow rudiment present only in posterior half.

Elytra (Fig. 301) as long as pronotum, with parallel margins in dorsal view, and marked humeral angles; puncta-

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tion very coarse and arranged in irregular series. Hind wings fully developed. Metatarsomere I little more than half as long as the elongate metatarsomere II.

Abdomen subparallel and distinctly narrower than elytra; punctation very fine and dense; interstices with distinct microsculpture; posterior margin of tergite VII with palisade fringe; posterior margin of tergite VIII obtusely angled in the middle.

♂: sternite VII with shallow median impression posteriorly, pubescence unmodified, posterior margin weakly and broadly concave (Fig. 302); sternite VIII as long as broad, median impression narrow, rather long, and with approximately 12 distinctly modified, short and stout black setae, posterior excision deep and almost V-shaped (Fig. 305); aedeagus 1.8 mm long; ventral process conspicuously bifid, subapically with pronounced ventral teeth (Figs 303–304).

Comparative notes. Among its congeners, *L. discrepans* is characterised not only by the male sexual characters, but also by its large size, the extremely dense punctation of the head and the pronotum, the broad and short pronotum, the conspicuous coloration of the legs, the shape of the elytra, and by the morphology of the tarsi.

Distribution and natural history. The type locality is situated some 120 km to the southwest of Hanoi in North Vietnam (Fig. 140). According to the collector, the type specimen was found in dead banana trunks saturated with water, together with *Tachinomorphus fulvipes* (Erichson, 1840) and *Coproporus* sp. (Kleeberg, pers. comm.).

SPECIES BELONGING TO OTHER GENERA

***Tetartopeus gracilentus* (Kraatz, 1859), comb. n.** (Figs 306–314)

Lathrobium gracilentum Kraatz, 1859: 115 f.

Type material examined. Lectotype ♂, present designation: "Ceylon / Coll. Kraatz / Syntypus / Coll. DEI Eberswalde / Lathrobium gracilentum (Kr.) [sic], V.I. Gusarov det. 1994 / DEI Müncheberg, Col – 02763 / Lectotypus ♂ *Lathrobium gracilentum* Kraatz, desig. V. Assing 2011 / Tetartopeus gracilentus (Kraatz), det. V. Assing 2011" (SDEI). Paralectotypes: 1♂, 3♀♀: same data as lectotype, but "Col – 02764", "Col – 02765", "Col – 02766", "Col – 02767", respectively (SDEI).

Comment. The original description is based on an unspecified number of syntypes from "Ceylan" (Kraatz 1859). Five syntypes, two males and three females, are deposited in the Kraatz collection at the SDEI. All of them had lectotype or paralectotype labels by V. Gusarov ("des. 1993") attached to them. Since a lectotype designation was never published, these labels were removed and new (para-)lectotype labels were attached to the specimens. The lectotype is illustrated in Figs 306 and 314. Figs 307–313 are based on paralectotypes.

The species undoubtedly belongs to the genus *Tetartopeus* Czwalina, 1888 and represents clear evidence that the range of the genus, which was previously considered to be Holarctic (Assing 2011b), reaches deeply into the Oriental region.

Redescription. Body length 5.5–6.0 mm; length of forebody 3.1–3.4 mm. Coloration: body blackish-brown to black, elytra with distinct yellowish spots in postero-lateral angles; legs dark-yellowish to yellowish-brown with darker profemora and protibiae; antennae brown with reddish apical and basal antennomeres.

Head (Fig. 306) approximately 1.15 times as long as broad, widest across eyes; posterior angles not marked; punctation fine and very dense, dorsal surface almost matt; interstices reduced to narrow ridges; median dorsal portion often with small impunctate patch. Eyes large and bulging, approximately 0.7 times as long as distance from posterior margin of eye to neck in dorsal view. Antenna long and slender, approximately 2.4 mm long.

Pronotum (Fig. 306) approximately 1.3 times as long as broad and as wide as head; punctation coarser and less dense than that of head; interstices without microsculpture and glossy.

Elytra (Fig. 306) approximately 0.95 times as long as, and distinctly broader than pronotum, humeral angles marked; punctation dense and slightly finer than that of pronotum; interstices without microsculpture and glossy. Hind wings fully developed.

Abdomen narrower than elytra; punctation very fine and very dense, dorsal surface practically matt; posterior margin of tergite VII with palisade fringe.

♂: tergite VIII obtusely angled posteriorly (Fig. 307); sternite VIII with small posterior excision in somewhat asymmetric position (Fig. 308); aedeagus approximately 0.9 mm long, shaped as in Figs 311–314.

♀: posterior margin of tergite VIII acutely produced in the middle (Fig. 309); sternite VIII much longer than tergite VIII, its posterior margin convexly produced in the middle (Fig. 310); tergite X distinctly shorter than tergite IX in the middle.

Comparative notes. The species is highly similar and evidently closely related to *T. fragilis* (Sharp, 1889), *T. pallipes* (Sharp, 1889), and *T. wui* (Zheng, 2001), but distinguished by the larger eyes, head shape (posterior angles practically obsolete), the straight ventral process of the aedeagus, by the shapes of the internal structures of the aedeagus, and by the posteriorly acutely produced female tergite VIII.

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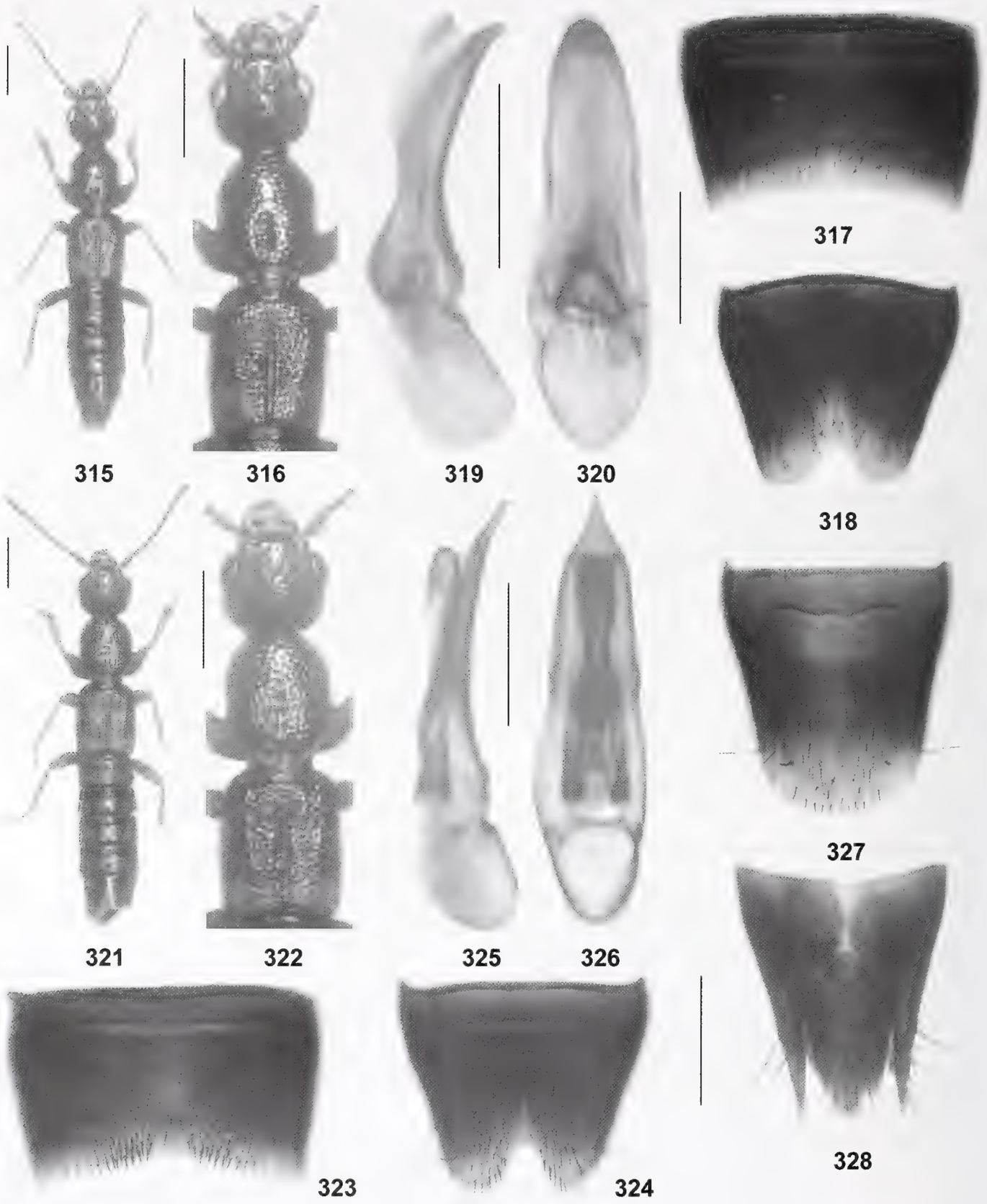

Figs 315–328. *Lobrathium lobrathioides* (**315–320**) and *L. lobrathiforme* (**321–328**). **315, 321:** habitus; **316, 322:** forebody; **317, 323:** male sternite VII; **318, 324:** male sternite VIII; **319–320, 325–326:** aedeagus in lateral and in ventral view; **327:** female sternite VIII; **328:** female tergites IX–X. Scale bars: 315–316, 321–322: 1.0 mm; 317–320, 323–328: 0.5 mm.

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Distribution. This species has become known only from Sri Lanka.

***Tetartopeus wui* (Zheng, 2001), comb. n.**
Lobrathium wui Zheng, 2001: 324 f.
Lobrathium bimaculatum Li, Tang & Zhu, 2007: 261 f.; **syn. n.**

Comment. The original description of *Lobrathium wui* is based on a male holotype from "Shanmuping, 780 m, Tianmushan, Zhejiang" and three paratypes from "Chanyuansi" (Zheng 2001).

Lobrathium bimaculatum was transferred to *Tetartopeus* by Assing (2010). The external and sexual characters were illustrated and additional records from China, among them also a male from Tianmushan, and Taiwan were reported by Assing (2011b).

As can be inferred from the illustration of the aedeagus of *L. wui*, the species belongs to *Tetartopeus* and there is little doubt that it is conspecific with *T. bimaculatus*. Hence the synonymy proposed above.

"*Lathrobium*" *sublaeve* Motschulsky, 1858
Lathrobium sublaeve Motschulsky, 1858: 647.

Comment. Based on the morphological details specified in the original description and on the type locality ("Indes orientales"), this species is most unlikely to belong to either *Lathrobium* or *Lobrathium*. Motschulsky (1858) compares *L. sublaeve* with "*Sunius filiformis*", today *Astenus procerus* (Gravenhorst, 1802), suggesting that *L. sublaeve* is not even a member of Lathrobiina.

***Lathrobium lobrathioides* sp. n.** (Figs 315–320)

Type material. Holotype ♂: "China: SE Sichuan, Jinfo Shan, 29°01N, 107°14E, 1800 m, 27.VI.1998, A. Smetana [C70] / 1998 China Expedition J. Farkač, D. Král, J. Schneider & A. Smetana / Holotypus ♂ *Lathrobium lobrathioides* sp. n., det. V. Assing 2011" (cAss).

Etymology. The specific epithet (Latin, adjective) alludes to the external resemblance of this species with species of the genus *Lobrathium*.

Description. Body length 7.2 mm; length of forebody 4.1 mm. Habitus as in Fig. 315. Coloration: body blackish, elytra with large reddish spot posteriorly reaching lateral and posterior margins; legs reddish with darker femora; antennae reddish, with slightly darker antennomere I.

Head (Fig. 316) transverse, 1.15 times as wide as long, widest across eyes; posterior angles broadly convex, very weakly marked; punctation coarse and, except in median dorsal portion and on frons, very dense; interstices with shallow microsculpture. Eyes large and bulging, somewhat shorter than distance between posterior margin of eye and neck, but distinctly more than half as long as this distance in dorsal view. Antenna not particularly slender, 2.1 mm long.

Pronotum (Fig. 316) 1.17 times as long as broad and 0.92 times as broad as head; punctation distinctly sparser and coarser than that of head; interstices without microsculpture and very glossy.

Elytra (Fig. 316) 0.93 times as long as, and distinctly broader than pronotum, lateral margins subparallel in dorsal view; humeral angles marked; punctation coarse and rather dense; interstices without microsculpture and glossy. Hind wings apparently fully developed.

Abdomen approximately as broad as elytra; punctation relatively coarse and dense on anterior, finer and sparser on posterior tergites; interstices with very shallow transverse microsculpture and glossy; posterior margin of tergite VII with palisade fringe; posterior margin of tergite VIII distinctly convex.

♂: sternite VII with small and shallow median impression without modified pubescence, posterior margin broadly and shallowly concave (Fig. 317); sternite VIII weakly transverse, with shallow median impression posteriorly, this impression without modified setae, posterior excision small and not very deep (Fig. 318); aedeagus 1.15 mm long, ventral process simple, dorsal plate lamellate and weakly sclerotised (Figs 319–320).

Comparative notes. *Lathrobium lobrathioides* is distinguished from other *Lathrobium* species particularly by its conspicuous coloration, the strongly transverse head with large and bulging eyes, and by the male sexual characters. It is additionally separated from externally similar *Lobrathium* species by the absence of a submarginal carina of the elytra.

Distribution and natural history. The type locality is situated in the Jinfo Shan in the south of Chongqing province, close to the border with Guizhou. The holotype was collected in an old deciduous forest at an altitude of 1800 m, by sifting moist to wet leaf litter and humus (Smetana pers. comm.).

***Lathrobium lobrathiforme* sp. n.** (Figs 321–328)

Type material. Holotype ♂: "China: Yunnan [CH07–24], Nujiang Lisu Aut. Pref., Gaoligong Shan, valley 18 km W Gongshan, 3020 m, 27°47'54"N, 98°30'13"E, mixed forest, litter, moss, wood sifted, 7.VI.2007, M. Schülke / Holotypus ♂ *Lathrobium lobrathiforme* sp. n., det. V. Assing 2011" (cAss). Paratypes: 2♀♀ [1 without head and pronotum]: same data as holotype (cSch).

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Etymology. The specific epithet (Latin, adjective) alludes to the external resemblance of this species with species of the genus *Lobrathium*.

Description. Body length 7.5–8.0 mm; length of forebody 3.7–3.9 mm. Habitus as in Fig. 321. Coloration: body blackish, elytra with moderately large, transverse reddish spot in posterolateral angles reaching lateral and posterior margins, but not suture; legs reddish-yellow to reddish with slightly darker femora; antennae dark-brown to blackish-brown.

Head (Fig. 322) transverse, approximately 1.15 times as wide as long, widest across eyes; posterior angles broadly convex, weakly marked; dorsal surface uneven, with shallow lateral impressions; punctation coarse and, except on frons, very dense; interstices with shallow microsculpture. Eyes large and bulging, almost as long as distance between posterior margin of eye and neck in dorsal view. Antenna not particularly slender, 1.9–2.2 mm long.

Pronotum (Fig. 322) approximately 1.1 times as long as broad and about 0.95 times as broad as head; punctation distinctly sparser and slightly coarser than that of head; interstices without microsculpture and very glossy.

Elytra (Fig. 322) approximately 0.9 times as long as, and distinctly broader than pronotum, lateral margins subparallel in dorsal view; humeral angles marked; punctation coarse and rather dense; interstices without microsculpture and glossy. Hind wings fully developed.

Abdomen approximately as broad as elytra; punctation relatively coarse and dense on tergites III–VI, finer and sparser on tergite VII; interstices with very shallow transverse microsculpture and glossy; posterior margin of tergite VII with palisade fringe; posterior margin of tergite VIII distinctly convex.

♂: sternites IV–VI with shallow median impressions, with dense asperate punctation and dense black setae; sternite VII with median impression and dense black setae, posterior margin broadly and shallowly concave (Fig. 323); sternite VIII weakly transverse, with median impression posteriorly, posterior excision small and not very deep (Fig. 324); aedeagus 1.5 mm long, ventral process apically acutely pointed in ventral view, dorsal plate lamellate and weakly sclerotised (Figs 325–326).

♀: sternite VIII with broadly convex posterior margin (Fig. 327); anterior portion of tergite IX divided in the middle, tergite X approximately twice as long as tergite IX in the middle (Fig. 328).

Comparative notes. Both in external and sexual characters, *L. lobrathiforme* is similar to *L. lobrathioides*. It is distinguished from this species by the smaller and more transverse elytral spots, the coarser punctation of the head, the much denser punctation of the pronotum, the chaetotaxy of the male sternite VII, the deeper posterior excision of the male sternite VIII, and by the morphology of the aedeagus (much longer and more slender, ventral process apically acutely pointed in ventral view).

Distribution and natural history. The type locality is situated in the Gaoligong Shan, Yunnan province, China. The type specimens were sifted from litter and moss in a mixed forest at an altitude of 3020 m.

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The urticating apparatus in the larva of the Lappet Moth, *Streblote panda* Hübner, 1820 (Lepidoptera: Lasiocampidae)

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Abstract. A morphological study of the urticating apparatus in the last larval instar of *Streblote panda* Hübner, 1820 (Lepidoptera: Lasiocampidae) was undertaken using a scanning electron microscope. It is composed of two meso- and metathoracic crevices, accompanied by urticating hairs, which open when the caterpillar is threatened. The urticating hairs taper at both ends and are mostly smooth but ringed on their distal part, which also features about 400 pores allowing the urticating liquid to be released.

Key words. Lasiocampidae, *Streblote panda*, scanning electron microscopy, urticating hairs.

INTRODUCTION

The Lappet Moth *Streblote panda* Hübner, 1820 (Lasiocampidae: Lasiocampinae) is distributed in Spain and North Africa. In Morocco, it is a common species on the plains and lower mountains of the Atlantic coast, the region of Souss (Southwestern Morocco) and the Western and Central High Atlas (Rungs 1981) where adults are active in January, June–July and October. *Streblote panda* is an eremic species that prefers littoral, sandy and open scrub areas (Calvo & Molina 2008). The caterpillars are highly polyphagous, feeding on the leaves of different plants from a broad spectrum of plant families such as Fagaceae, Euphorbiaceae, Myrtaceae, Fabaceae, Rosaceae, Salicaceae, Sapindaceae, Rutaceae and Tamaricaceae (Freina & Witt 1987). In Western Andalusia, it infests several perennial plants of ornamental and economic interest such as the Blueberry (*Vaccinium* sp., Ericaceae; Calvo & Molina, 2004). It has been considered a local pest for lime and grapefruit and its larvae may also have an unwanted effect in nurseries when they feed on young growing plants (Molina 1998).

The caterpillar of *S. panda* is known for its urticating properties. The urticating apparatus has not been studied in detail so far; Calvo & Molina (2008) simply mention that urticating retractable organs develop beginning from the second instar and appear as mere cuticle differentiations in the first instar. In the present study, details of the morphological structures responsible for the urticating properties are provided for the first time.

MATERIALS AND METHODS

Larvae of *Streblote panda* were captured at the Atlantic coast of Morocco at Essaouira in August 2005 and Oualidia in November 2008 on the foliage of *Retama monosperma* (Linné) Boissieu (Fabaceae). Their larval development comprises 5–8 instars (Calvo & Molina 2005). Only the last instar larvae have been collected and studied. For observation with scanning electron microscopy (SEM), the mesonotum and metanotum were dissected and isolated, dehydrated in absolute ethanol, mounted on specimen holders and coated with a thin layer of gold and palladium in a Jeol JFC-1100 sputter coater. Preparations were examined in a Jeol JSM-6400 SEM at 7 kV.

RESULTS

The urticating retractable apparatus is composed of two sets of hairs located on the dorsal surface of the mesothoracic and metathoracic segments (Fig. 1). In each segment, more than a thousand of these hairs are inserted in the internal walls of an integumentary fold composing a deep, crescent-shaped crevice. At rest, the latter is retracted and reveals externally only a transverse line whose edges are lined with a few hairs. When active, the pocket opens, revealing and spreading all the hairs it contains (Fig. 1). A single type of urticating hair has been observed. It is spear-shaped, 0.65–1.10 mm long (Fig. 5), with a slender base (Fig. 6) and pointed distally (Fig. 7). It is delicately stri-

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Fig. 1. Larva of *Streblote panda*, last instar. Left: at rest, right: disturbed, showing the two urticating crevices.

ated longitudinally from the base onwards over 14/15th of its length (Fig. 7). The distal part (1/15th) comprises an area with annular ligaments (Figs. 7, 8), tapering to the pointed and perforated tip (Figs. 9, 10). The estimated number of pores per hair is about 400; their diameter reaches 0.3 µm. The hairs are inserted in raised cupolae, from which they may be detached (Fig. 11).

Different types of integumentary structures are associated with the urticating apparatus:

– Some thirty white scales, 0.30–0.35 mm long, are lined up along the posterior edge of each urticating pocket (Fig. 12), whereas dark scales are spread over the rest of the segment (Figs. 13, 14). The white scales, which have the form of a strongly elongated tennis racket (some visible in fig. 3), are covered with longitudinal ribs made up of overlapping elements resembling roof tiles (Fig. 15). This structure is analogous to that of scales found on butterflies' wings.
– Five–six nonporous sensilla chaetica, 0.90–1.15 mm long, are found on the pair of white D1 verrucae in the anterior area of the meso- and metathorax (Figs. 16, 17). Other sensilla chaetica, 0.50 mm long, are found among the urticating hairs (Fig. 18).
– Sensilla filiformia, 1.5–2.0 mm long, are found in lateral tufts on the meso- and metathorax (Fig. 16).

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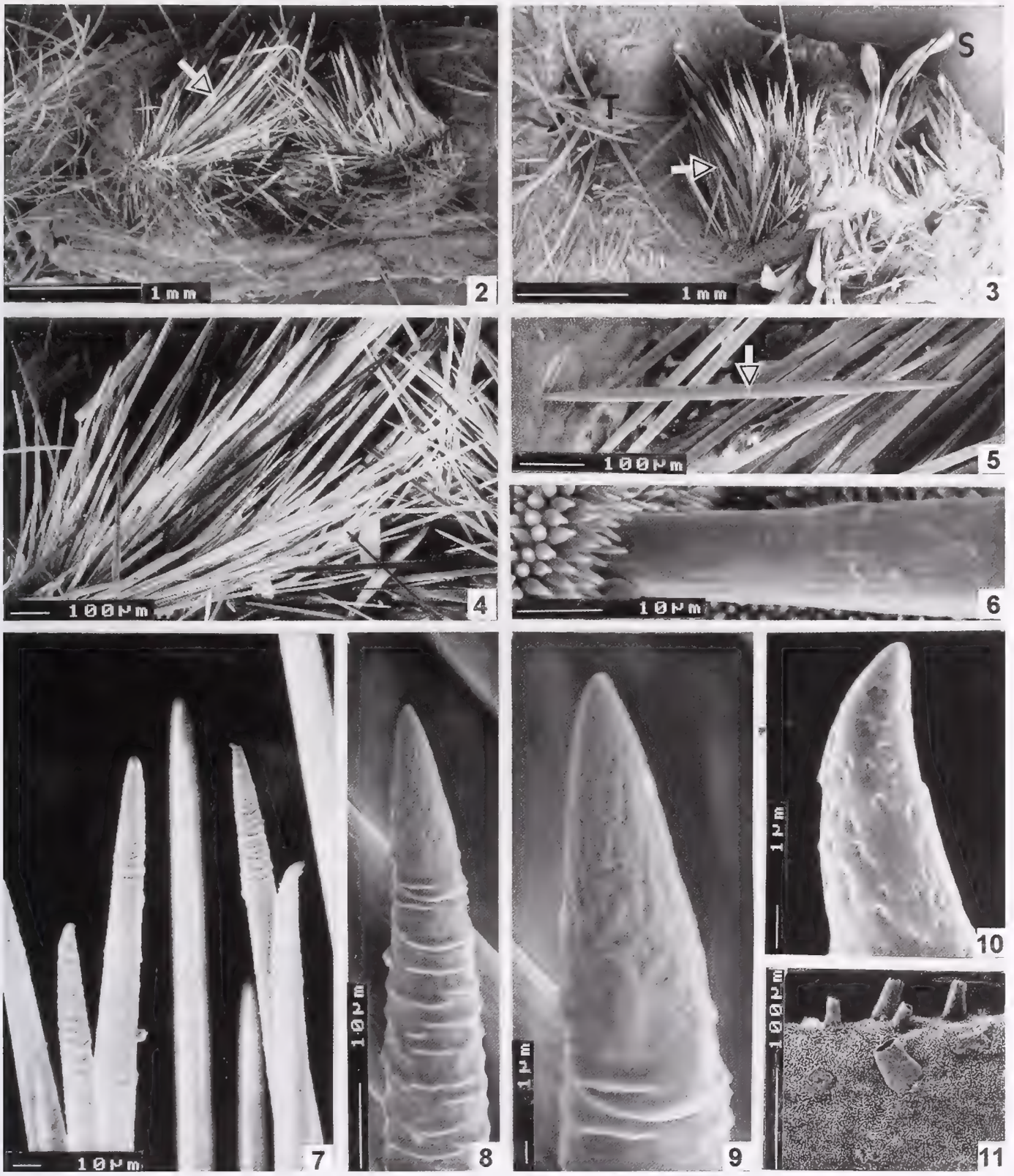

Figs 2–11. Urticating apparatus of *S. panda*. **2**. Urticating crevice on the mesothorax, showing urticating hairs (arrow). **3.** Setal tubercle (T), urticating hairs (arrow) and scales (S). **4**. Group of urticating hairs. **5–11**. Urticating hairs. **5.** Entire hair (arrow). **6**. Base of hair. **7**. Tips of hairs. **8**. Tip of hair with ringed and perforated area. **9**. Detail of the perforated area. **10**. Detail of distal pores. **11**. Cupolae of urticating hairs.

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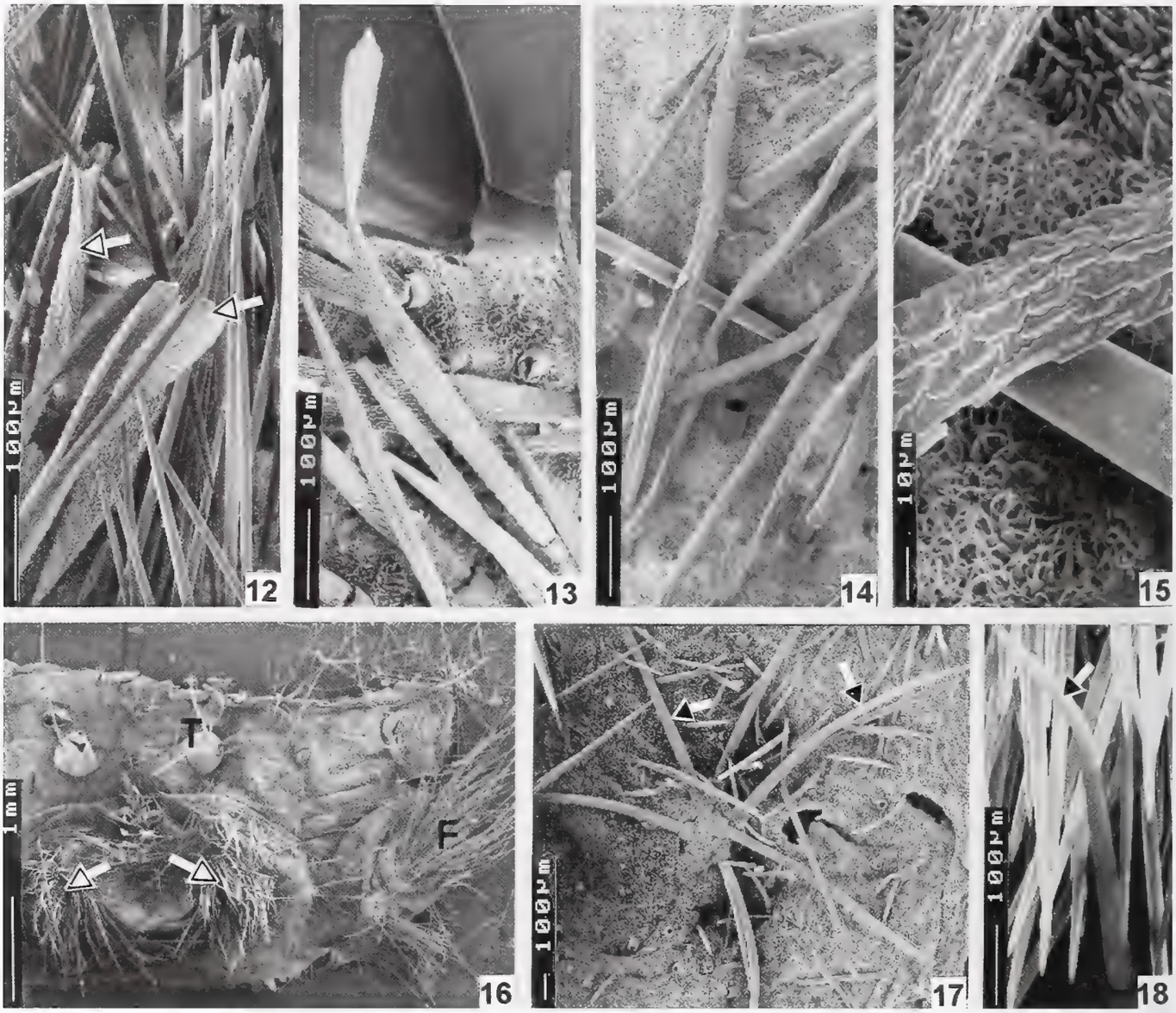

Figs 12–18. Scales, tubercles, sensilla and urticating hairs of *S. panda*. **12**. Scales (arrow) among urticating hairs. **13**. Isolated scales. **14.** Filiform scales. **15.** Detail of scales. **16**. Dorsal surface of the metathoracic segment showing two setal tubercles (T), urticating hairs (arrows) and filiform sensilla (F). **17**. Setal tubercle with sensilla chaetica (arrows). **18**. Sensillum chaeticum (arrow) among the urticating hairs.

DISCUSSION

Structure. The large number of urticating hairs is characteristic of urticating apparatuses (Bourgogne 1951). Unlike ordinary long hairs, the urticating hairs of lepidopteran larvae are typically not arranged at random and do not cover the caterpillars' bodies in a uniform manner. They are arranged in very dense groups on well defined surfaces known as 'mirrors' that are integumentary folds (Sellier et al. 1975) or other specific surface areas. The first larval instars lack urticating hairs. In the 5th larval instar of the 'brown-tail moth' *Euproctis chrysorrhoea* (Linnaeus) (Lymantriinae), the 'pine procession moth' *Thaumetopoea pityocampa* (Denis & Schiffermüller), and the 'oak procession moth' *Thaumetopoea processionea* (Linnaeus) (Thaumetopoeinae), these mirrors are located on abdominal segments I–VIII whereas in the 3rd instar of the same species, they appear on different segments (Sellier et al. 1975). This difference in location of defense-related setae among instars is rather unusual, given that in most groups, as in *S. panda*, the position is constant throughout the larval development. After they appear in the 2nd instar (according to Calvo & Molina 2008), they remain on the same thoracic segments, a situation known from many other species of Lasiocampidae (e.g., in the genera *Dendrolimus* and *Gastropacha).* Other lasiocampid moths, such as *Macrothylacia rubi*, *Lasiocampa quercus* and others, are known to possess urticating hairs on the abdominal segments (Carter & Hargreaves 1988).

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A single type of urticating hairs is known in *S. panda*. This is also the case in most other species of different families (Gilmer 1923, 1925; Faucheux 2007). However, there are also species that have several different types of hairs, e.g. three types in *Latoia thamia* Rungs (Limacodidae) (Faucheux 2000). Among the different forms of urticating hairs, the most frequent in lepidopteran caterpillars is a harpoon-shaped hair with pointed spikes directed towards its distal end and arranged in three or four longitudinal rows, e.g. as in *T. pityocampa, T. processionea, E. chrysorrhoea* (Sellier et al. 1975), *Lithosia quadra* Linnaeus (Faucheux 2007), and in one type of *L. thamia* (Faucheux 2000). These hairs, though hollow, are not perforated at any extremity and therefore are unable to inject the toxic substance (Sellier et al. 1975). Instead, they must be broken, for example in the skin, in order to release their urticating substance (Ducombs et al. 1979).

In another type of hair, the nucleus of the poison-gland cells is located at the base of the hair and the cells develop inside the hair. During contact, the urticating substance is released as the acute, sharp end of the hair breaks. This type has been described in the "urticating thorns" of *Latoia* (= *Parasa*) *hilarata* Staud. (Mills 1925) and in the "poison apparatus" of *Latoia* (= *Parasa*) *latistriga* Walker (Gilmer 1925). Gilmer (1923) distinguishes two types of poisonous apparatuses of which the one he considers more primitive consists of simple hairs that are shorter and stiffer than others; each hair is connected through its proximal end to a poison gland and opens in a distal pore (e.g., *Orgyia leucostigma* (J. E. Smith)). The structure of the urticating hairs of *S. panda* may therefore be close to this primitive type, as the irritating substance flows through the numerous pores located on the distal end of the hair.

Function of the mirrors. The mechanism for opening and closing the 'mirrors' (or crevices) that contain the urticating hairs was described for *T. pityocampa* by Demolin (1963). In this species, the implantation zone of the hairs is delimited by a semi-rigid frame made up of chitinous rods and small pads forming hinges. This arrangement can open or close the insertion zones of the hairs that are normally hidden. When the caterpillars feel threatened, this mechanism opens the fold and the urticating hairs become entirely exposed. In *S. panda*, the opening mechanism has not been studied in detail, but may function in a similar way.

Urticating function. The urticating, harpoon-shaped hairs of the 'brown-tail moth', the 'pine procession moth', and the 'oak procession moth' can penetrate skin and eyes, and cause irritating cutaneous eruptions or contact dermatitis and ocular lesions (Blair 1979, Ducombs et al. 1979). Their urticating properties last for a very long time, sometimes up to several months after their ejection (Ducombs et al. 1979). In these species, the combination of a mechanical element (penetration of the skin and breaking of the hairs caused by scratching) and a chemical element (discharge of a toxic substance derived from dermal glands) account for the pathological symptoms. The action of the urticating hairs is ascribable, at least in part, to the secretion of histamine that takes place on the skin as a result of the penetration of the poison contained in the hairs (Leclercq 1977).

In *S. panda,* urticating hairs are released in large numbers when the caterpillar is handled. In contact with the skin, they stick to it by means of their distal circular ligaments, but the urticating effect seems to be low. The numerous pores at the distal ends of the hairs indicate that a liquid is being released, but direct evidence is still missing. Previous studies do not mention strong irritations or even dermatitis caused by the caterpillars of the lappet moth.

Protective function. The aposematic red and dark brown of the two urticating crevices strongly contrast with the overall grey colour of the larva. Unlike other urticating caterpillars, those of *S. panda* undoubtedly use their urticating apparatus mainly as a means of warning against their predators. To my knowledge, no study has tested the efficacy of this defence mechanism against natural enemies. In the environment in which I observed the Moroccan caterpillars (colonies of *Retama* sp.), they come in frequent contact with likely predators such as the common chameleon, *Chamaeleo chamaeleon* Linnaeus and the stripeless treefrog, *Hyla meridionalis* Boettger, which may hesitate to prey on the caterpillars. Similarly, children and adults are unwilling to touch a caterpillar that manifests its anxiety by opening and closing its hair slits.

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Scotopteryx kuznetzovi (Wardikian, 1957) (Lepidoptera, Geometridae, Larentiinae), a new species for the fauna of Iran and Turkey

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Abstract. *Scotopteryx kuznetzovi* (Wardikian, 1957), a rare and habitually remarkable Larentiine species described from Armenia, is recorded for the first time from Iran and Turkey. Males from both countries are illustrated, the females being still unknown. A redescription is given and diagnostic characters are presented. External features and genitalia are mainly compared with those of *S. vicinaria hyrcanaria* (Staudinger, 1892), described from northern Iran, and other taxa of the *vicinaria* species group which all have genitalia very similar to *S. kuznetzovi*. The taxonomic position of the latter is briefly discussed.

Key words. *Scotopteryx kuznetzovi,* redescription, new records, Iran, Turkey.

INTRODUCTION

Scotopteryx Hübner, 1825, a Larentiine genus belonging to the tribe Xanthorhoini Pierce, 1914, contains more than 70 species which are distributed in the Palaearctic region from Europe to Far East Asia, in South Africa and South America (Parsons et al., 1999). Neither in the latter publication nor in the updated list of the Geometridae of the World (Scoble & Hausmann, 2007) *Scotopteryx kuznetzovi* (Wardikian, 1957) was mentioned. Until now, no further records of this species, which was described on a single male from Armenia, have been published. Here we record the data of five additional males found in the collections of the Zoologisches Forschungsmuseum Alexander Koenig, Bonn (ZFMK, collection Peter Kuhna) and Hayk Mirzayans Insect Museum (HMIM) in the Iranian Research Institute of Plant Protection, Tehran, recently. In addition, we provide a redescription of this almost unknown species and compare it with the probably related taxa of the *S. vicinaria*-group.

TAXONOMY

Redescription of *Scotopteryx kuznetzovi* (Wardikian)

Ortholitha kuznetzovi Wardikian, 1957: 281.

Type Material. Holotype ♂, (collection of the Zoological Institute, Academy of Science of Armenia).

Type locality. Yerevan (Armenia).

Scotopteryx kusnetzovi: Wardikian, 1985: 27, 52 (incorrect subsequent spelling).

Scotopteryx kuznetsovi: Viidalepp, 1996: 13 (incorrect subsequent spelling).

Material examined. 2 ♂: Basmendj [NW Iran, SE Tabriz], 15.10. [19]74, [leg.] Damanabi, gen. preps 1063 & 1064/2010 H. Rajaei, Iran; coll. HMIM. 2 ♂: Ost Türkei, Van, 2700 m, Güzeldere Pass, 28.9.1981, leg. P. Kuhna, gen. prep. 3074, P. Kuhna; 1 ♂: Turkey, Prov. Bitlis, Van Gölü, 19 km E of Ahlat, 1700 m, 42°34' E, 38°46' N, 18.10.1993, leg. Gy. Fábián, B. Herczig, Gy Laszlo and K. Szeóke, coll. ZFMK.

Morphology of adult males (Figs 1, 2). Wingspan 29–30 mm. Antenna bipectinate from base to tip, except 2–3 distal segments, rami moderately long, black, dorsally unscaled, arising ventrally from the proximal end of the flagellum segments, the latter scaled white dorsally. Head, thorax and abdomen covered with mixed greyish-white and greyish-brown scales. Frons broad, roundly protruding, lower part smoothly covered with very small, greyish-brown scales, upper margin a broad band of large, white scales, vertex with large white and brown scales mixed. Chaetosemata transversally extended. Palpi short and narrow, acute at tip, just reaching beyond the clypeus. Haustellum almost completely reduced. Tibia of hindlegs not dilated, index of spurs 0-2-4. Forewings elongated, length 16–18 mm, apex and tornus rounded. Ground colour yellowish-brown, surface shining, basal area and medial band edged with dark brown internally and white externally. Basal line moderately (in Turkish specimens) to strongly (in Armenian and Iranian specimens) indented. Antemedial line roundly curved in the middle, with two acute incisions anteriorly and posteriorly, the latter enlarged and completely dividing the medial band in the

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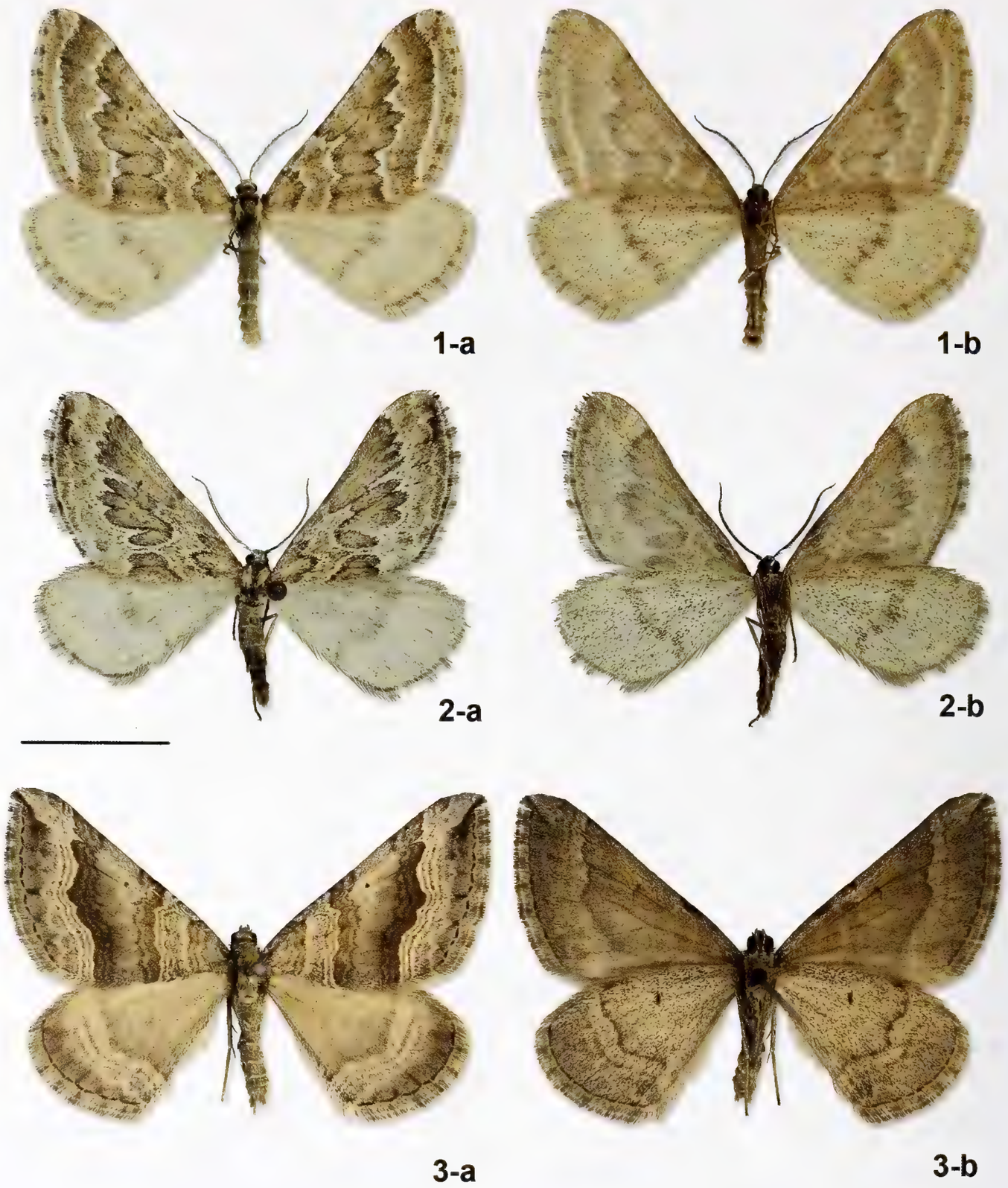

Figs 1–3. Adults (males) of *Scotopteryx*. **1–2.** *Scotopteryx kuznetzovi*: **1.** Güzeldere Pass, E. Turkey; **2.** Basmendj, Iran. **3.** *Scotopteryx vicinaria hyrcanaria*, syntype, "Schakuh" [Semnan Prov., NE Iran]; a: dorsal view, b: ventral view. Scale bar: 1 cm.

holotype and in specimens from Iran. Postmedial line wavy, roundly curved outwards in the middle, also with two deep incisions at either side. Submarginal line white, rather smooth in Turkish specimens, wavy in the holotype and the Iranian material. Apical whitish triangular patch distinct in the holotype, but weakly defined in the other specimens. Fringe consisting of a row of shorter and darker basal scales and a row of longer and lighter terminal

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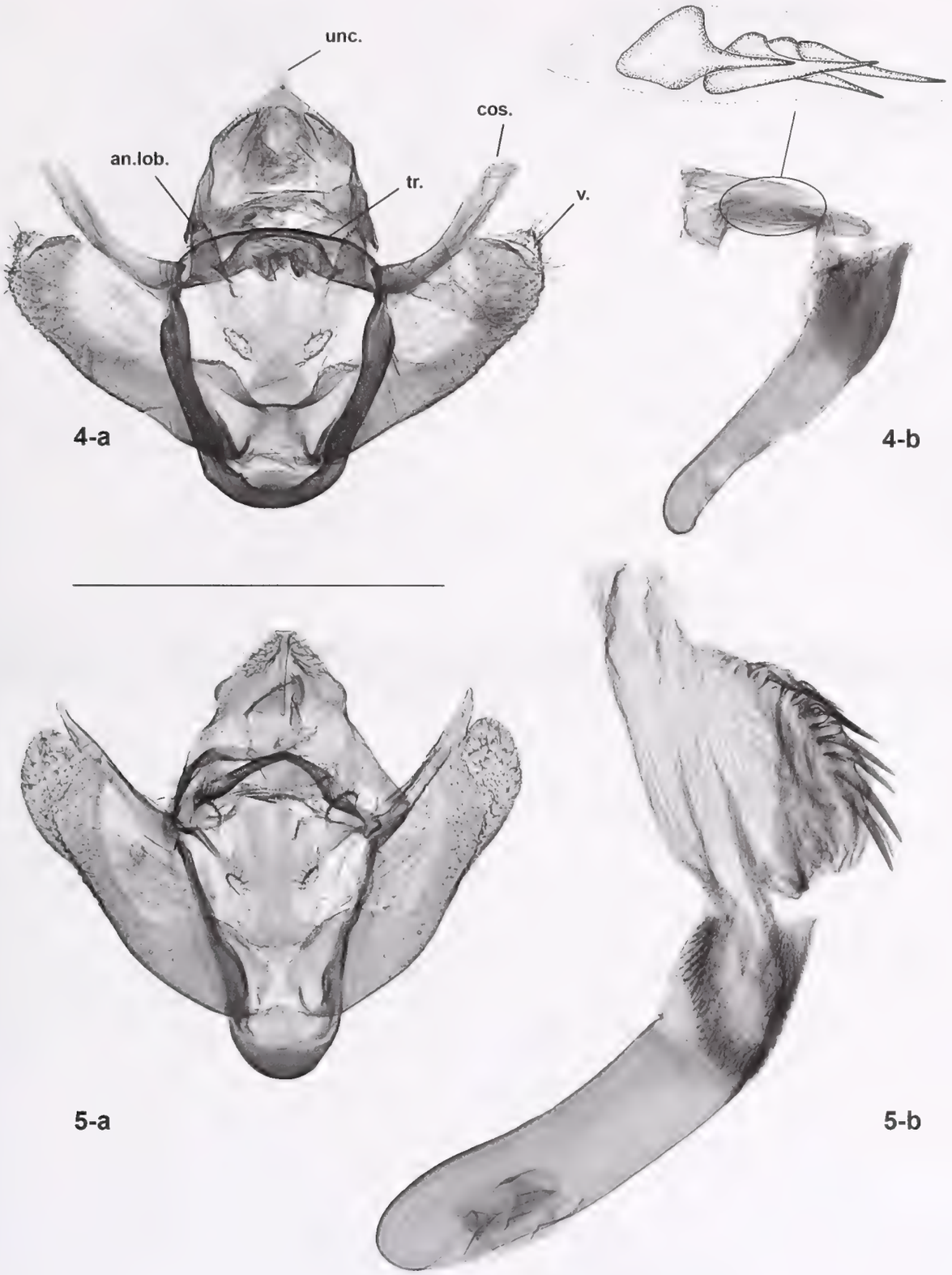

Figs 4–5. Male genitalia. **4.** *S. kuznetzovi* (NW. Iran); **5.** *S. vicinaria hyrcanaria* (Schahkuh); **a.** genital armature, **b.** aedeagus. Abbreviations: unc. Uncus; tr. Transtilla; cos. Costa; v. Valva; an.lob. Anellus lobe. Scale bar: 1 mm.

scales, both with distinctly darker areas near the ends of veins. Discal dots black, narrow streak-like or separated into dots in the forewings, absent in the hindwings. The latter oval, elongated, whitish-grey, with a darker grey medial band. Fringe as in forewings. Underside generally paler, but basal area up to postmedial line darker than the rest, patterns of upper side only partly visible. Underside of hindwing loosely scattered with single dark brown

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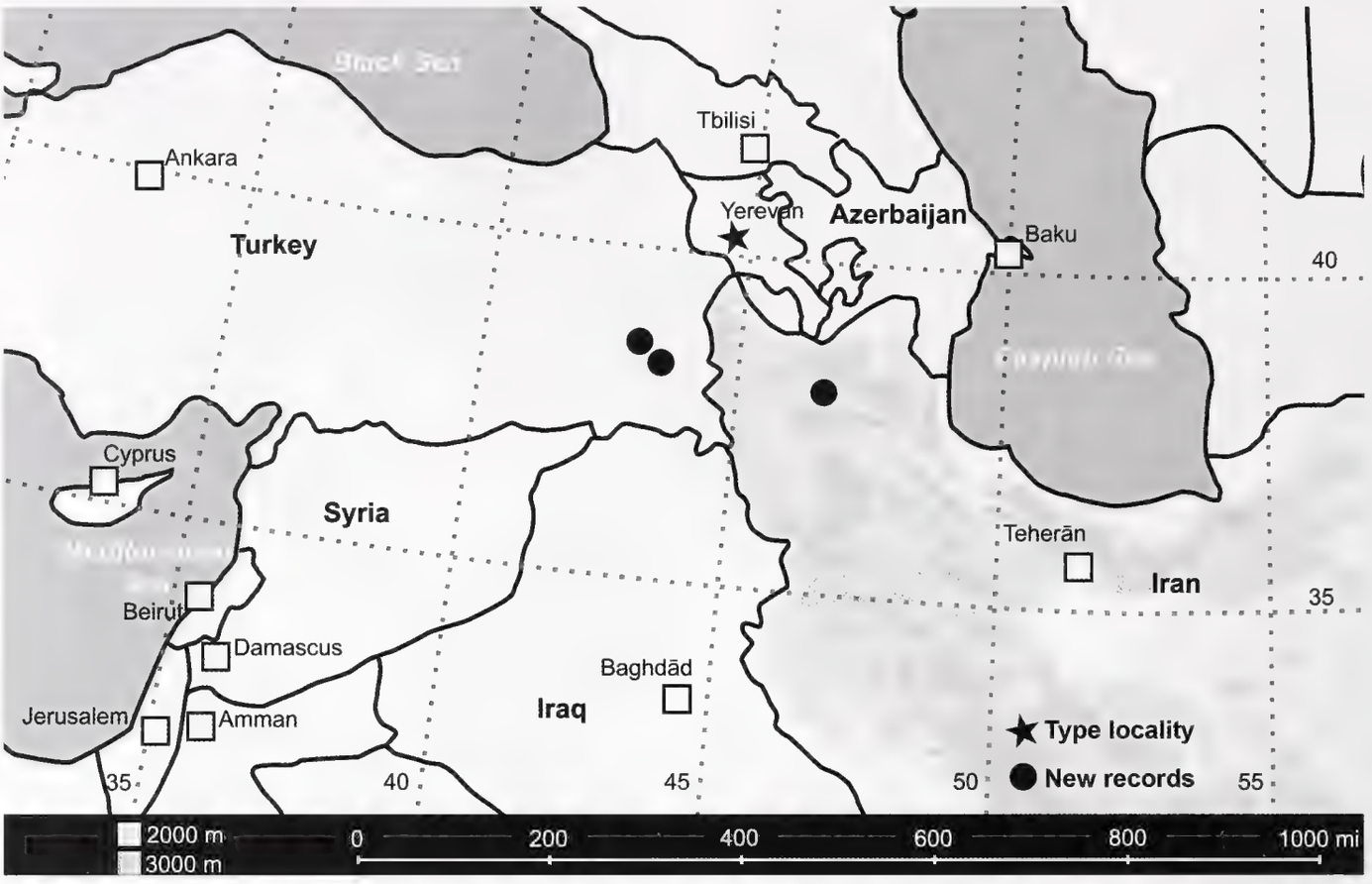

Fig. 6. Distribution map of *Scotopteryx kuznetzovi* (Wardikian, 1957).

scales. Abdomen long, narrow, light grey, with white posterior margins of the segments. Sternites elongate, ST7 and ST8 very small, no coremata developed.

Male genitalia (Fig. 4). Valve broad at base, sacculus sclerotized, without terminal processes; costa band-like, curved, longer than the remaining part of the valva and distally separated from it, with a rounded tip. Sacculus and valve lamina setose. Transtilla a curved, continous band. Uncus with a broad base and a narrow, acute tip, curved ventrad. Anellus lobes elongate, conical, distally rounded and setose. Aedeagus only a little longer than valve, slightly bent, distal one third covered with the densely spined part of manica (if not removed), vesica with four broad-based cornuti.

Female unknown.

Diagnosis. *S. kuznetzovi* is easily distinguished from other members of the genus *Scotopteryx* by its peculiar appearance and by a number of distinct characters (here compared mainly to members of the *S. vicinaria*-group, characters in round brackets): elongated forewings with glossy surface, rounded apex and tornus in *kuznetzovi* (forewings less elongated, not glossy, apex less rounded, angled or even slightly falcate; fig. 3); hindwing elongated-oval, much lighter than forewings and – except a medial band – without pattern (hindwings as dark as forewings and with much more pattern elements); antemedial and postmedial lines strongly waved and incurved, with deep incisions, sometimes medial band interrupted near hind margin (transverse lines smooth or – in *S. subvicinaria* – slightly waved, not interrupted; fig. 3); transverse lines highlighted with black inside and white outside, a white submarginals line present (transverse lines not highlighted in this way, submarginal line unconspicuous); antennae bipectinate from base to apex, except distal 2–3 segments (antennae bipectinate and agreeing in all details, but unpectinated distal portion distinctly longer); frons very broad, palps short and acute at tip, haustellum almost completely reduced (frons less broad, palps longer, broader and with rounded tip, haustellum well developed); abdomen without coremata, 7th segment with a small sternite (abdomen with a pair of coremata arising laterally from 7th segment, tergite and sternite of 7th segment reduced, membranous); aedeagus small, only slightly longer than valve, with a few small cornuti on vesica (aedeagus very large, at least two times the length of the valve, cornuti large and numerous; figs 4, 5); tip of uncus short, anellus lobes long (tip of uncus long, anellus lobes short, rounded; figs 4, 5).

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Bionomy. *S. kuznetzovi* seems to be an autumn-flying moth (end of September to end of October), based on the few specimens collected (altitude 1700–2700 m). Foodplant and larval stages are unknown.

Distribution. Armenia, NW Iran and E Turkey (fig. 6).

Taxonomic note. Habitually and in a number of morphological characters *S. kuznetzovi* is very different to and seems to be widely separated from other members of the genus *Scotopteryx*. Wardikian (1957) compared her new species with *S. bipunctaria* (Denis & Schiffermüller, 1775) which, however, has strongly different genitalia structures and belongs to another species-group inside *Scotopteryx*. We found that the male genitalia of *kuznetzovi* agree well and in detail with those of different taxa of the *S. vicinaria* – group (Figs 4, 5). The taxonomy of the latter (comprising *S. vicinaria*, *S. subvicinaria* and their subspecies *brunnescens* Prout, *hyrcanaria* Staudinger, *libanaria* Prout and probably *S. perplexaria* Staudinger) is still not fully understood, but is being revised in the course of further studies on Iranian Larentiinae by the senior author. Male genitalia capsules in all these taxa are extremely similar, specific differences can probably be found only in the number, size and arrangement of cornuti on the vesica, but also these characters seem to be variable. Molecular studies have been started, but the number of barcoded specimens is still too small and the results are not yet satisfactory. Fresh specimens of *kuznetzovi* are urgently needed to decide upon its position within the genus.

Scotopteryx kuznecovi Herbulot, 1996, mentioned in Parsons et al. (1999: 871) in contrast to *S. kuznetzovi* Wardikian, is externally similar to *S. chenopodiata* Linnaeus, 1758 and related taxa. Choi (2002) treated it, as well as *S. golovushkini* Kostjuk, 1991 (Transbaical region) as a junior synonym of *S. acutangulata* Inoue, 1941, described from Korea. Despite an identical origin and pronunciation of *kuznetzovi* Wardikian and *kuznecovi* Herbulot, the differences in spelling do not explicitly fall under the provisions of the Code (ICZN, 1999, articles 58.1.–58.15), of names deemed to be identical. So they are here not treated as homonyms.

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